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ABSTRACT

This report presents the objectives and accomplishments of the Stanford Center for Research and Development in Teaching from November 1, 1968 to July 31, 1969. A section on organization and administration includes a chart of the programs and project activities, and the supportive services. The four program areas are (1) heuristic teaching, (2) the environment for teaching, (3) teaching the disadvantaged, and (4) nonprogrammatic research. Each program is composed of a number of projects. The current state of each project is explained, as are the workings of the support services. Other information includes the names, duties, and organizational features of the officers, executive board, advisory panel, and the research and development associates staff. The professional staff are identified and a brief resume of their fields of interest is supplied. A list of center publications and products is included. [Chart on p. 13 may poorly reproduce on hard copy due to small print.] (MF)

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STANFORD CENTER FOR RESEARCH AND DEVELOPMENT IN TEACHING

School of Education
Stanford University

ED034306

FOURTH ANNUAL REPORT

August 1, 1969

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Submitted to the Research and Development Centers Branch, Division of Educational Laboratories, Bureau of Research, U. S. Office of Education, under Contract No. OE-6-10-078 (BR Center No. 5-0252). This report covers the period November 1, 1968 - July 31, 1969, with some reference to earlier activities of the Center.

RnBush

Robert N. Bush
Director of the Center

EA 002 628

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I. THE R&D CENTERS PROGRAM

The Stanford Center for Research and Development in Teaching is one of a system of nine Educational Research and Development Centers funded under the Cooperative Research Act (as amended by Title IV of the Elementary and Secondary Education Act of 1965). The program was organized as one response to an increased national awareness of the importance of finding solutions to critical educational problems.

More specifically, the R&D Centers program was devised to fill a unique role in relation to other forms of educational research and development, by providing a prime avenue for (a) bringing together a critical mass of interdisciplinary talent and other research resources from the behavioral sciences and other disciplines, (b) focusing on a crucial educational problem area by means of a long-range coordinated attack on large-scale problems, and (c) moving promising innovations through development toward an impact on actual educational practice. Although R&D Centers generally do not carry the innovative process through to final implementation themselves, they are charged with the responsibility for projecting a further route toward that goal by enlisting the interest of a regional educational laboratory, commercial developer, State or local agency, coordinating body, or other appropriate institution.

Although these centers have had an existence of only three to five years in which to build up their programs, they have already recorded some significant steps toward the achievement hoped for, and this Annual Report describes some of the accomplishments of one of these centers. The list of all nine R&D Centers is as follows:

Learning Research and Development Center, University of Pittsburgh (1964)

Center for the Advanced Study of Educational Administration, University of Oregon (1964)

Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin (1964)

Research and Development Center in Educational Stimulation, University of Georgia (1965)

Research and Development Center for Teacher Education, University of Texas at Austin (1965)

Stanford Center for Research and Development in Teaching, Stanford University (1965)

Center for Research and Development in Higher Education, University of California at Berkeley (1965)

Center for the Study of Evaluation, University of California at Los Angeles (1966)

Center for the Study of Social Organization of Schools, The Johns Hopkins University (1966)

Also funded through this same program is the National Laboratory on Early Childhood Education, which consists of a group of six university-based centers coordinating their research and development efforts through a National Coordination Center at the University of Illinois

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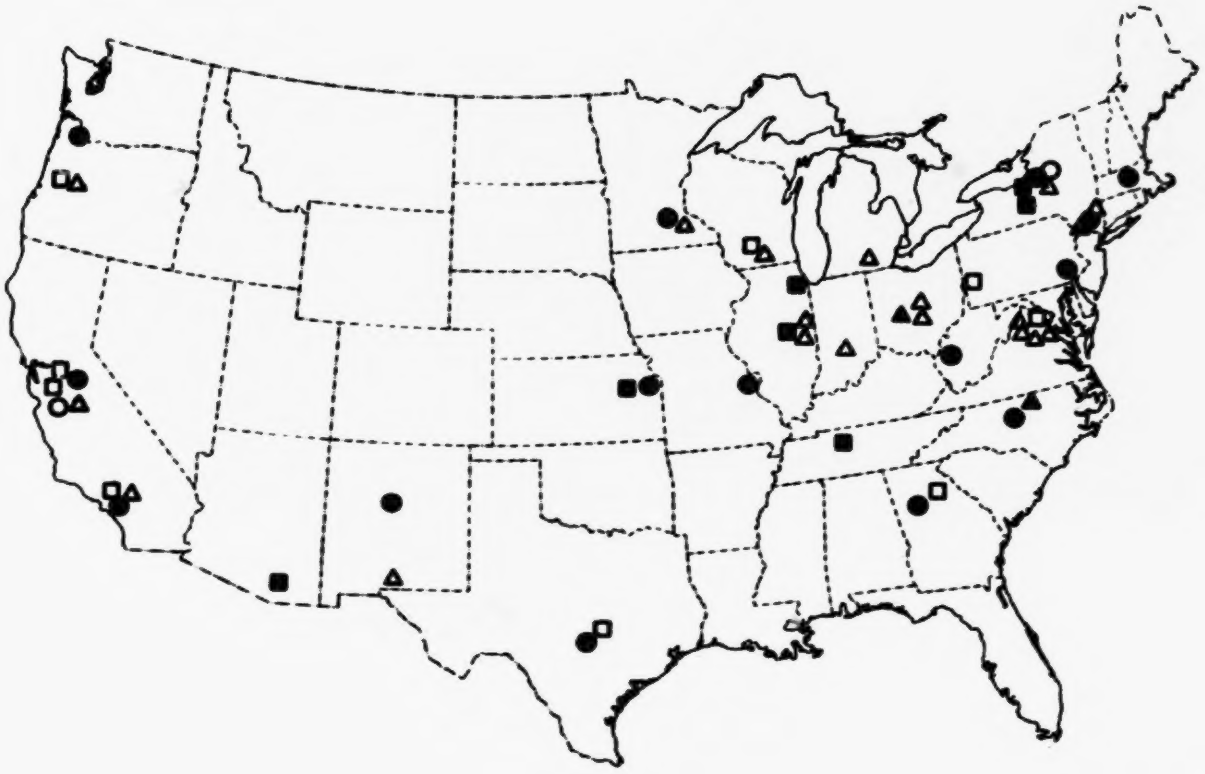
The Educational Research and Development Centers are part of a larger set of institutions which contribute in specialized ways to the improvement of educational practice. These include:

-- The two Educational Policy Research Centers, charged with providing a continuing examination of future educational needs and resources for the years 1980-2000.

-- The two Vocational Education Research Centers, established under the provision of the Vocation Education Act of 1963.

-- The system of 15 Regional Educational Laboratories, each of which concentrates on specific problems concerned with the development, demonstration, and dissemination of educational alternatives, materials, and practices for the schools; some of these have close relationships with the Educational Research and Development Centers.

-- The Educational Resources Information Center (ERIC), a nationwide network for acquiring, selecting, abstracting, indexing, storing, retrieving, and disseminating information about educational research and resources, including 19 ERIC Clearinghouses each providing coverage of a particular educational area.



□ Educational Research and Development Centers
■ National Laboratory on Early Childhood Education (6 centers plus the National Coordination Center)
○ Educational Policy Research Centers
▲ Vocational Education Research Centers
● Regional Educational Laboratories
△ ERIC Clearinghouses

II. HIGHLIGHTS OF THE SCRDT PROGRAM

A. INTRODUCTION

This Fourth Annual Report of the Stanford Center for Research and Development in Teaching reviews the Center's accomplishments and takes a brief look into the future. Although the emphasis is upon accomplishments, the report contains operating models and statements of goals for each of the three problem-oriented programs which serve as the focus for its organization. Systematic reviews of the progress of each program toward its goal during the academic year 1968-69 appear in Section III.

By way of orientation for those who may not have had access to previous reports of the Center, this introduction defines the Center's mission and highlights examples of the Center's accomplishments since its inception, as well as indicating some of the new directions in which we are moving.

The Stanford Center for Research and Development in Teaching, established in 1965, was approved for a five-year extension in July 1968 and is projecting its activities through 1973. As a result of its work during the first three years, the Center moved in 1968 to a revised statement of its problem area. It has now defined more clearly the urgent need for a fundamental reformulation of the future role of the teacher. Its mission is to specify as clearly, and on as empirical a basis as possible, the direction of that reformulation, to help shape it, to fashion and validate programs for training and retraining teachers in accordance with it, and to develop and test materials and procedures for use in these new training programs.

The Center is at work in three interrelated problem areas: (a) Heuristic Teaching, which aims at promoting self-motivated and sustained inquiry in students, emphasizes affective as well as cognitive processes, and places a high premium upon the uniqueness of each pupil, teacher, and learning situation; (b) The Environment for Teaching, which aims at making schools more flexible so that pupils, teachers, and learning materials can be brought together in ways that take account of their many differences; and (c) Teaching the Disadvantaged, which aims to determine whether more heuristically oriented teachers and more flexibly organized and operated schools can and should be developed to improve the education of those currently labeled as the poor and the disadvantaged.

Specific projects within the three problem areas are identified in the Program and Project Register which appears elsewhere in this report, and are described in detail in Section III.

In familiarizing themselves with the content of this report, readers will want to be aware of the history of the Center's development. Before the 1968 revised statement of problem areas, the Center concentrated on problems involving three kinds or domains of variables. The behavioral domain referred to those variables which deal with the observable, objectively describable behaviors of teachers and pupils in the classroom. Personological variables were defined as traits and characteristics of teachers and pupils, not directly observable in the classroom but rather inferred from responses to tests, inventories, and rating scales. The institutional domain of variables was concerned with how the role of the teacher is being affected by social and technological changes and by the social and administrative forces in the school district and the individual school.

Much of the work which originated in the behavioral and personological domains has been continued in the Center's program on Heuristic Teaching. Similarly, many of the concerns of the institutional domain have remained relevant for the program on the Environment for Teaching. The Center's newest program on Teaching the Disadvantaged, which began operation on July 1, 1968, also draws on concepts from each of the earlier formulations.

From the beginning, the microteaching technique and its accompanying concept of technical skills of teaching, both developed at Stanford, have been major subjects of investigation at the Center. Microteaching and the technical skills are by now too well known to require further description; a recent survey[1] indicates that 141 of 442 NCATE accredited secondary teacher training institutions have used the microteaching technique, the vast majority of them within the last three years. A recent book[2] summarizes the technique and covers some of the research done. A number of research reports have been issued by SCRDT, and more are in the process of completion. SCRDT has also issued a bibliography of Stanford-centered research on the topic.[3] A commercial firm has released a package of 34 films and 10 manuals for developing technical skills in teachers.[4] SCRDT also has available two training films on technical skills which have been widely disseminated. In addition, the Far West Laboratory for Educational Research and Development has extended the microteaching idea to its "mini-courses" designed for teachers already in service. In the development of these materials there has been fruitful interaction between personnel of the Far West Laboratory and of SCRDT, and the coordinator of SCRDT's Heuristic Teaching program is working with the Far West Laboratory in the development of one of these mini-courses, on higher-order questioning.

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[1] Ward, B. E. A survey of microteaching in secondary education programs of all NCATE accredited colleges and universities. Unpublished doctoral dissertation, University of South Dakota, 1969.

Since the Center's inception, the Secondary Teacher Education Program (STEP) of the Stanford University School of Education has maintained close relationships with the Center. STEP has often served as a laboratory in which ideas and hypotheses developed at the Center can be examined and tested. The STEP program is now moving into an exciting new reformulation, in which the emphasis has shifted from a model emphasizing the technical skills of teaching to a broader model drawing on additional concepts from the Heuristic Teaching program. The STEP program evolving for 1969-70 stresses the encouragement of inquiry behavior, the teacher's awareness of the classroom as a social system, the development of a crisis laboratory to simulate and evaluate crisis situations faced by teachers, the use of learning teams, and a taxonomy and longitudinal study of teacher personality and aptitude variables as they interact with teaching strategies. Thus just as five years ago the STEP program was influenced by the then-new concepts of microteaching and technical skills, so today STEP draws new concepts and lines of inquiry from the evolving program of the Center.

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[2] Allen, D. W., & Ryan, K. A. Microteaching. Reading, Mass.: Addison-Wesley, 1969. 151 pp.

[3] McKnight, P. C., & Baral, D. P. [Compilers] Microteaching and the technical skills of teaching: A bibliography of research and development at Stanford University, 1963-1969. Stanford Center for Research and Development in Teaching, Research and Development Memorandum No. 48, June 1969.

[4] Teaching Skills for Elementary and Secondary School Teachers. New York: General Learning Corporation, 1968.

One of the most interesting developments of the past year has been the opening of a store-front office in a troubled community by the Center's new program on Teaching the Disadvantaged. Through the project on Educational Community Organization, this office seeks to help members of disadvantaged communities find more effective means for influencing their educational institutions. As noted in the report on that project on Educational Community Organization, this year has seen the beginning of mobilization of resources from various parts of the university to help in this effort. This community-centered office may have a limited life and may very well be dissolved once its essential aims have been achieved.

The concept of the technical skills of teaching, which was fundamental to the former program on teacher behavior and to research on microteaching, has been continued in two of the four projects in the Center's Heuristic Teaching program. In addition to the investigation of technical skills in general, several earlier projects concerned themselves with specialized applications of the concept. During the past year a project dealing with the skills of foreign language teaching was brought to completion. Earlier the project had published two syllabi for teacher training,[5,6] which have been widely disseminated and used in teacher training courses. Currently the Center is investigating the possibilities of commercial distribution of these syllabi. A final report on the project[7] identifies qualities which were found to be characteristic of

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[5] Politzer, R. L. Practice-centered teacher training: French. Stanford Center for Research and Development in Teaching, Technical Report No. 1, 1966.

[6] Politzer, R. L., & Bartley, D. E. Practice-centered teacher training: Spanish. Stanford Center for Research and Development in Teaching, Technical Report No. 2, 1967.

[7] Politzer, R. L., & Weiss, L. Characteristics and behaviors of the successful foreign language teacher. Stanford Center for Research and Development in Teaching, Technical Report No. 5, April 1969.

successful foreign language teachers.

Also during the past year, the project on the technical skills of explaining produced a final report on its first stage, which was issued during the absence on sabbatical of the principal investigator.[8] The next steps for this project will be considered in the fall of 1969 when the principal investigator returns and is able to engage in planning discussions with his co-workers.

In the Heuristic Teaching program, the concept of "appropriate uncertainty" has developed rapidly, to the point at which its project leader conducted a pilot Institute on Teaching for Reflective Thinking for 15 selected teachers in the summer of 1969. This institute, supported as an Affiliated Project by separate funds from the Educational Professions Development Act, is another example of the development of materials and the dissemination of ideas which were originally funded by the USOE Bureau of Research through the Center but because of limited Center funding had to draw on additional sources of USOE funds to permit the full cycle of research, development, dissemination, and diffusion into practice. Over the next two years the members of the pilot group will develop and test teaching techniques and curricular modifications which will then be incorporated in in-service training programs within their districts.

A recent development of potential significance is a cooperative arrangement with the International Association for the Evaluation of Educational Achievement (IEA) for a survey of the literature on the relationship between teacher variables and student achievement. Through this Affiliated Project the Center will be able to contribute to the further work of this important international group and to advance its own central work, which attempts to tie changes in teacher behavior to changes in pupil behavior.

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[8] Gage, N. L., Belgard, M., Dell, D., Hiller, J. E., Rosenshine, B., & Unruh, W. R. Explorations of the teacher's effectiveness in explaining. Stanford Center for Research and Development in Teaching. Technical Report No. 4, December 1968.

Another major Affiliated Project came into existence during the past academic year. The Stanford Teacher Leadership Development Institute, directed by the Director of SCRDT, is also funded by the Bureau of Educational Personnel Development. It responds to one of the most serious problems in the education profession: the failure to develop and retain top level teachers. Its efforts will be directed not toward the support of existing teacher education programs, but toward restructuring and reorienting such programs. The Institute, working with those responsible for directing teacher education programs in other institutions as well as at Stanford, will draw heavily on the concepts, knowledge, skills, and materials developed in the SCRDT program.

During the academic year 1968-69 another Affiliated Project, with a long history of fruitful interaction with the Center, was brought to completion.[9] Known informally as the "aptitude-treatment interaction" project, the work was funded by a separate contract with the Basic Research Branch of the USOE Division of Elementary and Secondary Education but housed within the Center offices. The concept of systematically investigating the interaction of instructional treatment variables and student aptitude variables on learning has played a significant part in the development of the Heuristic Teaching program and will continue to be explored within that program.

An Affiliated Project of interest is an evaluation of nine model elementary teacher education programs which were developed under support from the USOE Bureau of Research. This evaluation, directed by Fannie R. Shaftel, will shortly result in a final report.

Among other activities, one of the earliest projects in the institutional domain concerned itself with the organizational context of teaching, with particular emphasis on the alleged advantages of team teaching. That project was essentially completed during 1968-69; its findings are summarized in the section on the Environment for Teaching.

A project added in the Environment for Teaching beginning July 1968 has produced some particularly interesting preliminary findings. Using tools of cost-effectiveness analysis, the project leader has found that teachers' higher verbal scores are more effective per dollar of expenditure than are teachers' years of experience in raising the achievement level of both white and Negro students. (Other findings in this project are reported under Project 0309.)

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[9] For the final report of this project, see L. J. Cronbach and R. E. Snow, Final Report: Individual Differences in Learning Ability as a Function of Instructional Variables. Contract No. OEC-4-6-061269-1217. March 1969.

The above examples illustrate the kinds of activities completed by the Center to date. In the main body of this report more detail will be found on the research, development, dissemination, and diffusion activities of the Center, both past and present.

B. CENTER ORGANIZATION AND ADMINISTRATION

A chart of the organization of the Center appears at the end of this section. However, any formal chart can be only an approximate rendering of the working relationships in a complex organization. A crucial fact about SCRDT is that it is located in a university setting and largely staffed by members of the faculty of that university together with supporting personnel. Relationships among the Director, the Executive Board, and the Research and Development Associates are therefore those of colleagues rather than superior and subordinate.

Within the framework of this relationship, the Center moves to accomplish research and development goals which reflect the collective judgment of its staff and are supported by the Bureau of Research of the U. S. Office of Education. The allocation of responsibilities can be summarized as follows.

The Director of SCRDT is responsible for supervising its work, for initiating proposals for action, and for implementing the policies and actions relating to program, personnel, and budget formulated by the Executive Board of the Center, which is made up of members of SCRDT with one outside representative. An Advisory Panel of distinguished educators and researchers from outside the Center meets twice a year to review the Center's activities and suggest further action.

The work of the Center is carried out by senior Research and Development Associates, with the assistance of junior Research Assistants. The work of the three programs is coordinated by Program Coordinators, who also serve on the Executive Board.

The major source of support for the Center is contract OE-6-10-078 between the Stanford University School of Education and the United States Office of Education under the provisions of the Cooperative Research Program. Additional support is provided by the School of Education. Affiliated Projects are projects directed by SCRDT staff members which draw on other sources of funds but make use of Center concepts and knowledge and have a direct relationship to the Center's goals.

Most of the Center's R&D Associates are members of the faculty of the School of Education or of other academic departments at Stanford. Research Assistants are doctoral candidates in the School of Education or other departments, who spend up to twenty hours a week assisting in the Center's research and development activities.

The Secondary Teacher Education Program (STEP) of the School of Education serves as a laboratory for some of the Center's research projects. New concepts of teacher education and new hypotheses about teacher-student interactions can be examined through experimental studies, often videotaped, in which STEP teaching interns and supervisors collaborate with Center researchers.

Support services for SCRDT include the Methodology Unit, the Administrative Officer and administrative staff, and the Publications, Dissemination, and Media Unit. The Center's offices at 770 Welch Road, about one mile from the heart of the Stanford campus, provide office space for the above activities and for a number of R&D Associates and Research Assistants. The Center's educational media operation is housed in the School of Education building.

The Center's research and development activities are carried out in various locations--the Educational Media offices and the classrooms in the School of Education building, the schools participating in STEP, cooperating schools in the San Francisco Bay Area and elsewhere, and other locations. Data from experimental or statistical studies are processed by the Methodology Unit at the Center. The project on Educational Community Organization in the program on Teaching the Disadvantaged maintains a store-front office in East Palo Alto. From this base project workers attend a variety of community meetings, both formal and informal, and carry on their research and development efforts.

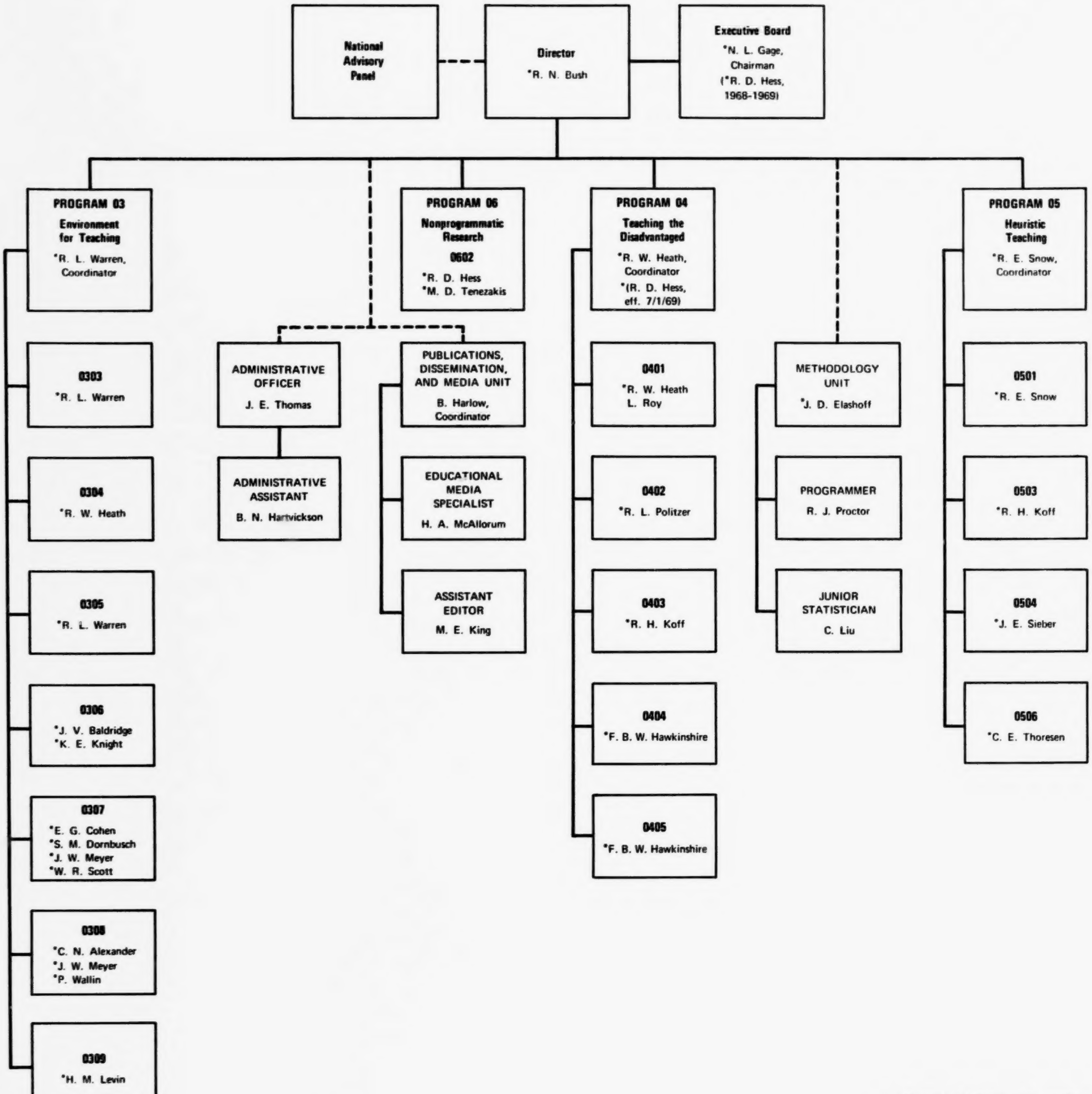
The Center staff have been greatly encouraged by the decision of the Bureau of Research to grant Stanford approximately $4,000,000 toward the construction of a new educational research building under the provisions of the Educational Research Facilities Program. The new building, to be located on the main Stanford campus near the present School of Education, will be designed specifically to implement the Center's program and will be the focal point for all Center activities. It will be a model laboratory equipped with the technology of the 1970's, with a sophisticated information processing system which will greatly enhance the Center's research and development capabilities. The 60,000-square-foot facility will provide opportunities for observing, recording, and reproducing the activities of students and teachers, using the latest in videotaping, electronic, and telemetry devices. Much of the recorded material will be tied to Stanford's central computer facilities. An architect has been selected, and the building is expected to be completed late in 1972.

The Center's relationship with the Stanford community extends beyond the School of Education. The current list of R&D Associates includes faculty members with sole or joint appointments in the Departments of Economics, Linguistics, Psychology, and Sociology and the Graduate School of Business. Members of the School of Law are cooperating with the project on Educational Community Organization. In addition, the usual informal interchanges between Center R&D Associates and other Stanford faculty are stimulated by the Stanford environment.

Members of the Center meet and work closely with the Far West Laboratory for Educational Research and Development, most notably in a cooperative developmental effort involving the Center's Training Studies project. The teacher training program at San Jose State College has contributed extensively to the Center's research and development, as have cooperating schools in the San Francisco Bay Area and elsewhere. State departments of education are represented on the Center's Advisory Panel by a state Commissioner of Education and a state Director of Compensatory Education; regional educational laboratories are represented by the Director of the Far West Laboratory. The Director of the Stanford Center serves on the Executive Panel of the Far West Laboratory and the National Advisory Panel of the ERIC Clearinghouse on Teacher Education.

The following organization chart represents the substantive program and project activities, and the supporting services, as of the date of this report. Complete titles of the programs and projects appear in the accompanying Program and Project Register. The operating conceptual models which give coherence to the Center's efforts are presented in a later section of this report.

Stanford Center for Research and Development in Teaching


National Advisory Panel
Director *R. N. Bush
Executive Board *N. L. Gage, Chairman (*R. D. Hess, 1968-1969)
PROGRAM 03 Environment for Teaching *R. L. Warren, Coordinator
PROGRAM 06 Nonprogrammatic Research 0602 *R. D. Hess *M. D. Tenezakis
PROGRAM 04 Teaching the Disadvantaged *R. W. Heath, Coordinator *(R. D. Hess, eff. 7/1/69)
PROGRAM 05 Heuristic Teaching *R. E. Snow, Coordinator
0303 *R. L. Warren
0304 *R. W. Heath
0305 *R. L. Warren
0306 *J. V. Baldridge *K. E. Knight
0307 *E. G. Cohen *S. M. Dornbusch *J. W. Meyer *W. R. Scott
0308 *C. N. Alexander *J. W. Meyer *P. Wallin
0309 *H. M. Levin
ADMINISTRATIVE OFFICER J. E. Thomas
ADMINISTRATIVE ASSISTANT B. N. Hartvickson
PUBLICATIONS, DISSEMINATION, AND MEDIA UNIT B. Harlow, Coordinator
EDUCATIONAL MEDIA SPECIALIST H. A. McAllorum
ASSISTANT EDITOR M. E. King
0401 *R. W. Heath L. Roy
0402 *R. L. Politzer
0403 *R. H. Koff
0404 *F. B. W. Hawkinshire
0405 *F. B. W. Hawkinshire
METHODOLOGY UNIT *J. D. Elashoff
PROGRAMMER R. J. Proctor
JUNIOR STATISTICIAN C. Liu
0501 *R. E. Snow
0503 *R. H. Koff
0504 *J. E. Sieber
0506 *C. E. Thoresen

* = Research and Development Associates

PROGRAM 03, ENVIRONMENT FOR TEACHING

0303 Professional Socialization of the Teacher
0304 Attitudes of Teachers Toward Their Occupation
0305 Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools
0306 Organizational Change
0307 Teacher in the Authority Structure
0308 Social Context of Teacher-Student Relations
0309 Characteristics of Effective Teachers

PROGRAM 04, TEACHING THE DISADVANTAGED

0401 Educational Community Organization
0402 Teacher Training: Standard English as a Second Dialect
0403 Developing Problem-Solving Skills Through Students Teaching Students
0404 Use of Small Groups in a Changing School
0405 Small Group Interaction

PROGRAM 05, HEURISTIC TEACHING

0501 Training Studies
0503 Microteaching and Intern Data Bank
0504 Uncertainty Studies
0506 Personal Competencies

PROGRAM 06, NONPROGRAMMATIC RESEARCH

0602 Impact of Technology

C. PROGRAM AND PROJECT REGISTER

Stanford Center for Research and Development in Teaching

Center No. 5-0252

July, 1969

The following is a list of identifying code numbers, titles, and principal investigators of the Center's substantive programs and projects and its administrative and support programs. To provide an indication of the relative size of the substantive programs, the right-hand column shows the percentage of the Center's budget devoted to each such program (Code Numbers 03 through 06) after administrative and support service costs have been prorated.

Code No.	Title	Investigator(s)	Prorated Percent of Center Budget FY 1969
03.	THE ENVIRONMENT FOR TEACHING	R. L. Warren	28.3
0302	The Organizational Context of Teaching	G. W. Sowards B. Lopossa	
0303	Professional Socialization of the Teacher	R. L. Warren	
0304	Attitudes of Teachers toward Their Occupation	R. W. Heath	
0305	Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools	R. L. Warren	
0306	Organizational Change: The Study of Innovations in Educational Institutions	K. E. Knight J. V. Baldridge	
0307	The Teacher in the Authority Structure	E. G. Cohen S. M. Dornbusch J. W. Meyer W. R. Scott	
0308	The Social Context of Teacher-Student Relations	C. N. Alexander J. W. Meyer P. Wallin	

0309	Characteristics of Effective Teachers and the Distribution of Teacher Services	H. M. Levin	
04.	TEACHING THE DISADVANTAGED	R. W. Heath	26.1
0401	Educational Community Organization	R. W. Heath	
0402	Teacher Training: Standard English as a Second Dialect	R. L. Politzer	
0403	Developing Problem-Solving Skills through Students Teaching Students: Use of Small Groups	R. H. Koff	
0404	Use of Small Groups in a Changing School	F. B. W. Hawkinshire	
0405	Small Group Interaction	F. B. W. Hawkinshire	
05.	HEURISTIC TEACHING	R. E. Snow	39.1
0501	Training Studies	R. E. Snow	
0503	Microteaching and Intern Data Bank	R. H. Koff	
0504	Uncertainty Studies	J. E. Sieber	
0506	Personal Competencies	C. E. Thoresen	
06.	NONPROGRAMMATIC RESEARCH		6.5
0602	The Impact of Educational Technology upon Noncurricular Dimensions of Children's Behavior: The Computer as a Socializing Agent	R. D. Hess	
07.	SUPPORT SERVICES		
0701	Publication and Dissemination Unit	B. Harlow	
0702	Advisory Services	R. N. Bush	
0703	Educational Media Unit	B. Harlow	
0704	Methodology Unit	J. D. Elashoff	
08.	ADMINISTRATION	J. E. Thomas	

III. PROGRAM ACTIVITIES 1968-69

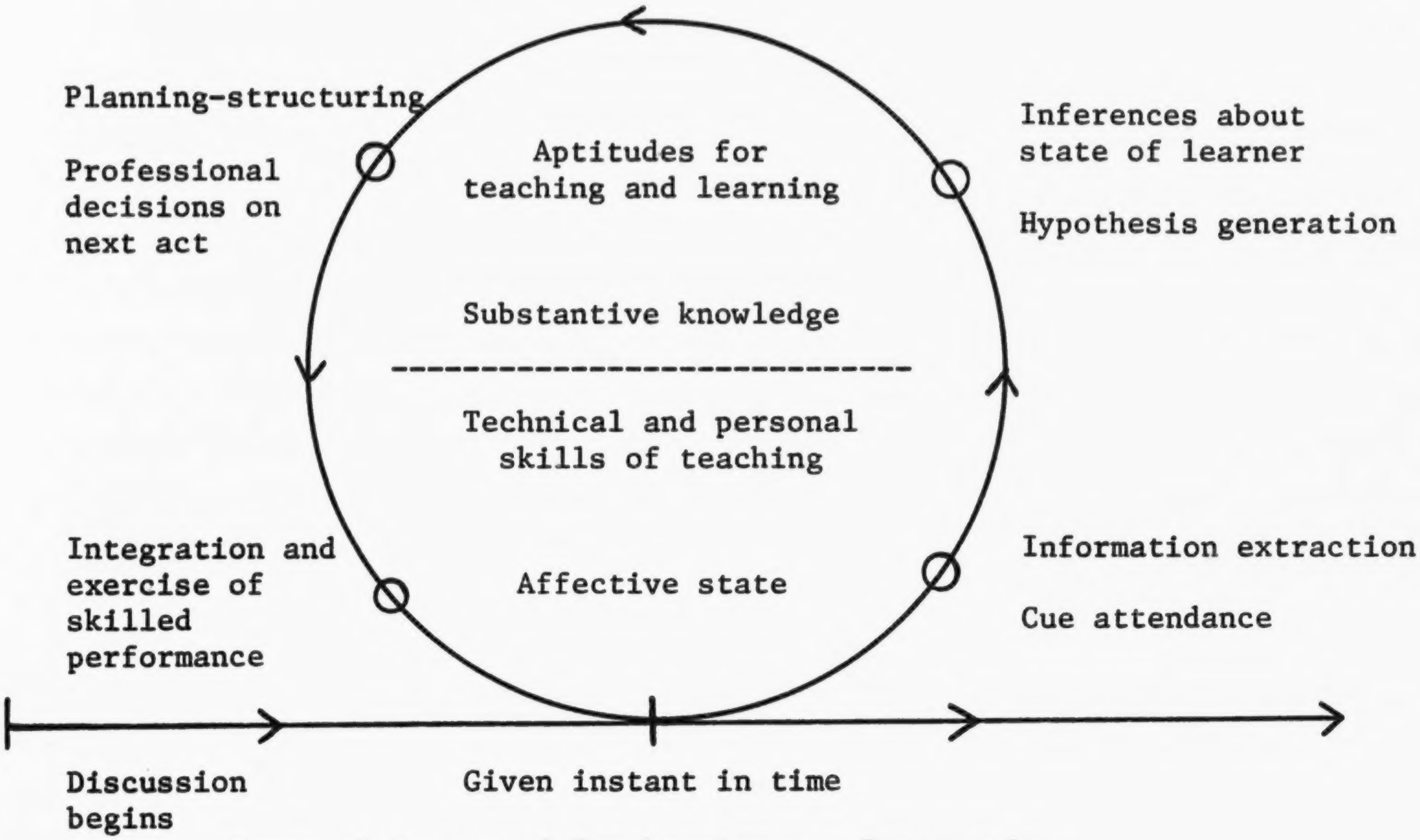
A. HEURISTIC TEACHING

(Program 05: R. E. Snow, Coordinator)

The general purposes of the Heuristic Teaching program are threefold: (a) to define heuristic teaching functions in education; (b) to understand the psychological processes of heuristic teaching and learning; and (c) to develop means of promoting heuristic teaching and learning in schools. The program was established in April 1968, growing directly from earlier Center work on microteaching and the technical skills of teaching approach to teacher training as well as other research on cognitive and affective interactions in the teaching-learning process. The term "heuristic" is meant to suggest an emphasis on inquiring, inductive, hypothesis-generating modes of instruction rather than on fact-dispensing, deductive, expository modes. While the program's research deals with teaching and learning in general, the hope is to develop new, more adaptive, and functional forms of human teaching through this emphasis. A long-range goal of the program aims at defining and improving the functional uniqueness of human teaching in relation to other components of the instructional system.

It is possible to look forward to an increasingly integrated theoretical framework, linking the program's research activities in substance as well as administratively, and to envision an increasingly diversified array of products resulting from the program's developmental efforts. At present, however, such a framework can be only roughly outlined. It must remain flexible enough to incorporate new findings and developments as they accumulate or to change drastically as the resulting new knowledge dictates.

Some of the elements of the growing theoretical framework, and some of the relations between current projects, are schematized in the following diagram. The diagram identifies cognitive events that are presumably involved in heuristic teaching behavior. One can assume, for example, that at some given instant in an ongoing group discussion a teacher attends to significant cues regarding the course of discussion, makes inferences about the state of confusion in some problem faced by the students, decides on a form of questioning or comment designed to open new aspects of the problem, and skillfully inserts such questions or comments into the stream of discussion. It can further be suggested that both the current course of classroom events and the teacher's earlier acquisition of skills will have been influenced by that teacher's aptitudes for teaching (and for learning to teach), by his substantive knowledge and repertoire of technical and personal skills, and by his affective or temperamental state at any given moment.


Planning-structuring
Professional decisions on next act
Inferences about state of learner
Hypothesis generation
Aptitudes for teaching and learning
Substantive knowledge
Technical and personal skills of teaching
Affective state
Integration and exercise of skilled performance
Information extraction
Cue attendance
Discussion begins
Given instant in time

Temporal Course of Teacher-Learner Interaction

On a somewhat larger time scale, the cycle can be used to characterize a teacher's behavior from day to day. A teacher summarizes the results of one day's discussion, observing particular points of success or concern. He makes inferences about the progress of comprehension for individual students or for the group as a whole, decides upon strategies for the conduct of further discussion, and as the next meeting proceeds, the formulated plan is executed.

Application of the schema presented above is not limited to the behavior of a teacher as a group discussion leader; it may be used to represent teaching processes in monitoring and critiquing an individual student's independent study report, in conversations with a parent, in preparing materials for weekly units, or in constructing an achievement test. Further, it is not meant to restrict attention to clearly cyclical patterns of teacher-learner interaction, for among the most important examples of heuristic teaching behavior may be the identification and pursuit of new ideas happened upon serendipitously in the course of lecturing. The diagram focuses on teaching; left implicit are comparable processes on the learner's side, which are no less important as both interacting and dependent variables for most of the research on teaching currently underway or envisioned for the program. The schema thus serves only roughly as a guide for this program report, showing how the concerns of the various projects of the Heuristic Teaching program may be related within the cognitive operations of the individual teacher.

At present, the program is composed of four projects, each led by a Research and Development Associate who, working with several Research Assistants, conducts studies and other activities related to one or another area of the schema. There is no one-to-one correspondence between projects and areas of program concern. While each project has its own emphasis, there is increasing coordination of efforts, particularly in those areas which have received most attention in past Center research. The next sections of this report will review separately the progress of each project during the past year.

Project 0501: Training Studies

One project, led by R. E. Snow, deals with identifying teaching and learning skills, designing training procedures for the development of such skills, and understanding the complex interactions between these variables and individual characteristics of teachers and learners. This is a continuation of previous Center research directed toward analyses of technical skills of teaching and the treatment variables affecting the acquisition of these skills.

During the past year the project has concentrated largely on teacher questioning and listening skills, which are regarded as fundamental to heuristic teaching styles. Also of major concern have been analyses of the sequencing characteristics of questioning behavior in microteaching sessions, the integration and retention of skills training for application in classroom teaching, and the interaction of teacher and student aptitude variables with instructional treatment variables.

Over the past several years, the program's research on microteaching and the technical skills approach to teacher training has succeeded in defining a series of specific teaching skills. Modeling treatments for preservice training of these skills have been produced. Skills such as reinforcing student participation, probing for elaborated student comprehension, asking questions requiring higher-order cognitive responses of students, etc., have been effectively isolated and developed in separate microteaching experiments. This year an attempt has been made to consolidate these gains, to extend their usefulness to a wider audience, and to formulate a second stage of experimentation on teaching skills. An extensive summary of the history and present state of microteaching and technical skills research has been prepared by David Berliner within the Training Studies project. All previous technical skills experiments are reviewed and suggestions for future research and development are made. The paper is now in the final stages of editing and should be available for distribution during the next quarter reporting period. A second summary paper, by Karen E. Claus, reviews existing taxonomic systems of use in research on teaching generally, with particular emphasis on the construction of a taxonomy of teacher questioning behavior. This complex skill has emerged from the earlier technical skills studies as one obvious and basic component of heuristic teaching styles. Work on this development will likely continue through the current fiscal year.

A study of modeling treatments in microteaching, in interaction with teacher aptitude variables, has been completed by Mary Lou Koran.[1] The skill to be acquired by Stanford interns was analytic questioning, a special category of the higher-order questioning skill studied earlier by Claus.[2] Video modeling, written transcript modeling, and control groups were used. It was found that modeling condition interacted with several teacher aptitude measures. Video modeling appeared to be the most effective training treatment for teachers with relatively low analytic ability and high visual memory while written transcript models served best for teachers with relatively high analytic ability and low visual memory. Further statistical analysis of these data using multiple regression methods is still underway and replications of the finding are being planned. If substantiated, the results would suggest that different teacher trainees require different treatments for most efficient skill acquisition in microteaching.

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[1] Koran, M. L. The effects of individual differences on observational learning in the acquisition of a teaching skill. Unpublished doctoral dissertation, Stanford University, 1969.

[2] Claus, K. E. Effects of modeling and feedback variables on questioning skills. Technical Report No. 6, Stanford Center for Research and Development in Teaching (in press).

Smaller pilot activities have attempted to support or extend earlier microteaching work. In one, further statistical analyses were performed on the higher-order questioning data previously reported by Claus (1969), yielding some suggestive hypotheses about the combination of questioning skills across microteaching trials. In another, videotape records of intern teachers were examined both before and after an intensive summer of microteaching training to investigate individual differences in skill profile change over training and potentially interesting individual differences in profile. Also using microteaching behavior before and after summer training experience, a third investigation examined teacher differences in the extent to which student achievement in a specified lesson could be predicted by student aptitude. High predictability might identify a teacher who maximizes the learning of able students while sacrificing the less able learner. Low predictability might suggest that a teacher distributes attention more equally, helping poor students at the expense of the more capable learners. Initial results indicated that teacher variation in this regard was observable though not particularly great. A fourth activity has attempted multidimensional scaling of teacher behavior rating items, as judged for similarity by supervisors from the Stanford Teacher Education Program. When completed, the scaling analysis should provide ideas about categorizations of teacher behavior as observed by supervisors.

Two more general extensions of the technical skills work have also begun during the past year. One of these involves a cooperative arrangement between the Center and the Far West Regional Laboratory. Through the minicourse program of the Far West Lab, the microteaching-technical skills approach has been elaborated considerably for use in in-service training programs in schools. Members of our staff are now cooperating with Far West Lab personnel in the field installation of a minicourse on questioning techniques. A research study using refined versions of the minicourse is now being jointly planned. This study is a new kind of collaboration between an R&D Center, a teacher-training program, and a Regional Educational Laboratory and should serve as a prototype for many such cooperative ventures. A second, more theoretical, extension involves reanalysis of previously collected data on questioning behavior in microteaching. The work attempts to characterize sequences of teacher and learner interaction in terms of formal mathematical models. If successful, such sequence and pattern measures should better represent strategies of teacher questioning than the total frequency measures used heretofore and provide improved criteria for training studies. Also, this project will hopefully serve as a first step toward the use of theoretical models of a more formal mathematical sort in the analysis of teaching processes.

In considering sequences of teacher questions rather than single questions only, it becomes clear that effective questioning depends heavily on effective listening. Heuristic teaching must involve a process of comprehensive reception of cues from the learner's discussion and subtle analysis of this information in formulating subsequent questioning. Thus, in the past year, the project has begun conducting studies of listening skills and the possibility of training such skills in teachers. A programmed audiotape unit on listening, available from Xerox Corporation for use with businessmen, has been used in two studies designed as initial evaluations to serve further developmental planning. First, a pilot trial with eight experienced teachers showed that marked improvement in listening skill, as measured by the unit's audio pre- and posttests, could be realized for many individuals. The attitude of teachers toward this type of training also appeared strongly favorable. Second, a larger scale experiment was conducted using 54 preservice teachers from three content areas of STEP. Experimental-control group comparisons again indicated striking improvement using specific pre- and posttests, but no differences among content areas. The study also included followup classroom observation of teacher use of student comments and a survey of teacher aptitude variables in relation to listening improvement, but statistical analysis of these data are not yet complete.

Another classroom observation study has also been initiated to assess the extent and variety of teacher use of student comments in class discussion and to relate this variable to the type and level of cognitive activity represented in teacher discussion generally. Teacher consistency from day to day and between different class groups is also being analyzed. Through such correlational work, it is hoped that the relation of teacher questioning and listening behavior to more general cognitive activity in real classrooms may be understood. An improved observation procedure for further work on teacher questioning and listening skills should also be obtained.

Project 0503: Microteaching and Intern Data Bank

This project, directed by R. H. Koff, extends earlier training studies work to the more general context of teacher education programs. It includes the development, conduct, and evaluation of all microteaching activities in the Stanford Teacher Education Program of the School of Education, the development of new training approaches aimed at professional decision making, interpersonal understanding and diagnostic and evaluative behavior of teachers, and the systematic collection of ability, personality, and performance data on Stanford teacher trainees for a longitudinal study of teacher development.

While the goals of this project have not changed substantially from those expressed in the Third Annual Report (see especially pages 94-95), the scope of the project has been enlarged considerably.

The data bank now contains information concerning personality and aptitude characteristics as well as samples and evaluation of teaching behavior which has been collected on all the participants in the STEP program since its inception. A computerized catalog now enables a researcher to specify given characteristics about an individual or a group of individuals and retrieve correlative data concerning that sample. In addition, the data bank now contains information which describes various characteristics of all applicants to the STEP program over a ten-year period of time, including those applicants who were denied admission and those applicants who were admitted and chose not to attend. The data bank thus provides a valuable store of information enabling researchers to focus on long-term developmental changes in teachers as a function of the interaction of selection variables and teacher training experiences.

A format has been developed by which information concerning each applicant to the teacher education program can be systematically collected and evaluated with reference to potential success in the STEP program based upon earlier empirical study. In addition, these data are then deposited in the data bank for potential use in research. A classification system for all videotapes which contain instances of teaching has been developed. A data bank videotape library is being established which will enable the researcher to specify characteristics about a teacher, teaching behavior, or student characteristics, and immediately retrieve a videotaped sample containing the specified teaching-learning situation. Such a library will be particularly useful in teacher-training programs.

The project is beginning to suggest new strategies for training, research, and development. Information is emerging which will enable the teacher trainer to use much pretraining data in a diagnostic manner and thus provide more personally relevant teacher training experiences. In addition, the microteaching concept is expanding beyond its former use as a training setting for the acquisition of "technical skills" to include instructional design and interpersonal interaction.

Project 0504: Uncertainty Studies

A third project is entitled Uncertainty Studies, led by Joan E. Sieber. The project's chief goals are to discover techniques of teaching persons to generate and reduce warranted uncertainty, to discover which of these techniques are most effective in each curriculum area, and to develop a model of in-service teacher training appropriate for dissemination and maintenance of the teaching skills developed. Such skills are regarded as an essential component of heuristic teaching styles. Methods of student evaluation which assess both these teaching skills and the ability of students to profit from various ways of generating and reducing uncertainty in relation to their individual characteristics are being sought.

To reach these goals, a series of pilot studies was conducted to seek methods of teaching students to recognize when they have insufficient information to be certain of conclusions, to generate hypotheses, to act counter to the norm that one appears certain of his views, and to persist in difficult and frustrating tasks. Paradigms and sample lessons of teaching for warranted uncertainty are being designed and tested in history, science, social studies, spelling, and art. Methods have been devised to evaluate the ability to recognize the correctness of one's own factual knowledge, to discern when one's information is adequate for drawing a conclusion with certainty, when to ask questions which will increase relevant information, and to recognize when more than one point of view applies, or more than one explanation is relevant. The willingness and ability to take part in classroom discussions when more information is required before one can answer questions with certainty, the ability to generate alternatives, to estimate one's likelihood of correctness, and to observe problem details can also be evaluated.

Each method has been described and discussed in relation to the goals of various curriculum areas, and rationales for several scoring techniques within each method are being developed.

Several research findings have been obtained but not yet formally reported. In a study by Sieber, Marilyn Epstein, and Charles Petty, modeling and concept formation procedures of teaching for warranted uncertainty were found to be effective in facilitating the development of warranted uncertainty in fifth-grade children. A study by Sue Crockenberg on the effect of modeling on task persistence found that elementary school students who observed a model persisting and succeeding were more likely to persist and succeed at difficult mathematics tasks than subjects who observed a model persist and fail, or who observed no model. Persistence was curvilinearly related to expectation of success, suggesting that a moderate degree of uncertainty about one's likelihood of success is most conducive to persistence and success. A study by

Nancy Stein found that Mexican-American students, unlike Anglo students, failed to make problem-relevant visual discriminations unless encouraged to manipulate problem materials. In some in-class studies of history teaching, it was found that games demonstrating selectivity and inaccuracy of human perceptions lead to students' tendency to question and examine historical statements found in their own textbooks, and to compare them with information available elsewhere.

These findings suggest several implications for education and for further research. As an outgrowth of the Stanford Institute on Teaching for Reflective Thinking (an Affiliated Project which held an institute at Stanford in the summer of 1969), the staff expects to develop a variety of teacher training materials and a model of in-service teacher training to aid in creating a differentiated teaching staff which consults and disseminates teaching skills among its members and to others. Teaching curriculum and evaluation innovations currently being developed are being written in manual form.

Project 0506: Personal Competencies

The overall goal of the Personal Competencies project, directed by C. E. Thoresen, is to provide teachers with an increased sense of understanding and control of their own behavior and that of others. The project seeks to prevent many of the problems that confront young teachers in the classroom and in related areas of their lives. A personally competent individual is one who understands the causal relationships between how and why he acts the way he does with special attention to the influence of his environment, and who alters his environment to bring about desired consequences. The project this year is focused on assessing the personal problems and concerns of teachers in training and assisting a small group of intern teachers in reducing excessive anxiety reactions to a variety of stress situations that they encounter in the classroom and other everyday life situations. During the past year considerable time was spent with teachers in training to assess the types and intensity of problems. The research and clinical literature on the use of techniques to reduce excessive anxiety reactions (a common teacher problem) was reviewed. A group of 16 teaching interns was identified and treated for the types of personal concerns confronting them. The specific behavioral concerns of each intern were observed in the classroom before and after treatment.

One major finding this year has been that effective intervention must occur very early in the professional training of teachers. Efforts to offer individual help were often too late to alter meaningfully overall behavioral patterns established during the first few months of teaching. More than two-thirds of Stanford interns who indicated an interest in receiving individual help in strengthening personal competencies (approximately 25% of the total intern population) indicated that this kind of assistance would be far more meaningful and relevant if provided in the beginning of training rather than during the latter half of the academic year. The feasibility of the training, however, was established in that there was very strong support of efforts to assess and enhance personal competencies. Of 16 interns who were initially interviewed, eight participated in individualized treatment programs. Five other interns dropped out during treatment, three completed the initial interview and at least one classroom observation only. Preliminary data analysis indicates that interns who remained in treatment showed significant reductions in individual concerns. The primary reason, as reported by interns, for not remaining in the project was that personal assistance being offered was considered too late to make any appreciable difference. Several interns had already decided not to enter the field of teaching.

Since this was the first attempt to work with teachers in training in the area of personal competencies, all procedures were viewed as highly tentative. It was found that there was a favorable response to individualized invitations to participate in the project. Furthermore, personal contact via a telephone call and individual interview was found to be effective as viewed by the interns themselves. A major problem involved the time delay between the initial individual contact and the beginning of treatment. This was caused in part by the need to train the project staff in the interval. The need to make several in-class observations of problem-related behaviors of teachers created problems in terms of observing and recording behavior in the classroom. Currently, a classroom observation procedure is being developed to provide a standardized record of classroom behavior.

This year's project clearly highlighted the complexities of the phenomena subsumed under the concept of personal competencies. It further emphasized the need to highly individualize the techniques and criteria in working with a particular intern, due in part to the complex interaction between the individual intern, the curricular area, the particular school setting, and the type of students involved. The experience with interns this year emphasized the heterogeneity of personal competencies possessed by teachers in training, suggesting the need to develop a variety of initial assessment techniques to be used then in offering differential treatment programs. Problems of personal competency for teachers, however, did tend to cluster in two areas labeled "Classroom Behaviors and Their Management" and "Professional Relations," that is, personal behaviors with colleagues, parents and others.

The variety of procedures attempted has suggested a format and sequence of learning experiences for teachers in training, such as the principle of reinforcement and its uses in the classroom, the social modeling of behavior patterns, and the concept of counterconditioning and problems of excessive anxiety and stress. Furthermore, the project did demonstrate that graduate students in counseling can be specifically trained to work with teachers in training in dealing with their personal concerns. The results to date suggest that the teaching interns did perceive staff members as possessing the skills and understandings necessary to provide meaningful assistance to them. In addition, it was found that it is feasible to monitor certain physiological behaviors of individuals in the classroom settings. That is, this can occur unobtrusively and without interfering with the naturalistic setting.

A main implication is that a variety of training experiences for assessing and strengthening personal competencies is crucial in the professional training of teachers. There is a clear and demanding need. At the same time, there is a host of problems that demand inquiry in terms of how to assess initially and how to intervene on a more individualized basis. The results of this year's efforts have provided the impetus for designing an early intervention program which will be conducted with a group of beginning interns during their first quarter in the summer of 1969. The basic question being asked is this: Can personal competencies be assessed and strengthened prior to the occurrence of major problems; will such intervention appreciably reduce the frequency and magnitude of problems encountered later in training; and will interns be more effective in coping with problems that are encountered. This year a variety of techniques were tried, such as systematic desensitization, assertive training, in vivo role-playing, insight-oriented individual interviews and selective positive reinforcement. The staff's experience this year strongly suggests that training interns to employ these procedures is greatly enhanced by a close personal contact in the classroom setting, providing immediate feedback on performance. An intriguing question is: Can interns be assessed prior to the onset of training to determine which interns will benefit most effectively and efficiently with what types of intervention?

It is becoming increasingly clear, based on this experience, that the human component in teaching, namely the physically present teacher, has to do primarily with high levels of personal effectiveness in relationships with others. That is, the primary domain of the human teacher in contrast to nonhuman training devices may lie in the area of affect and emotions in the patterns of interpersonal verbal and nonverbal behavior having to do with how one feels and perceives. And it also seems increasingly clear that teacher training has historically done very little in this area.

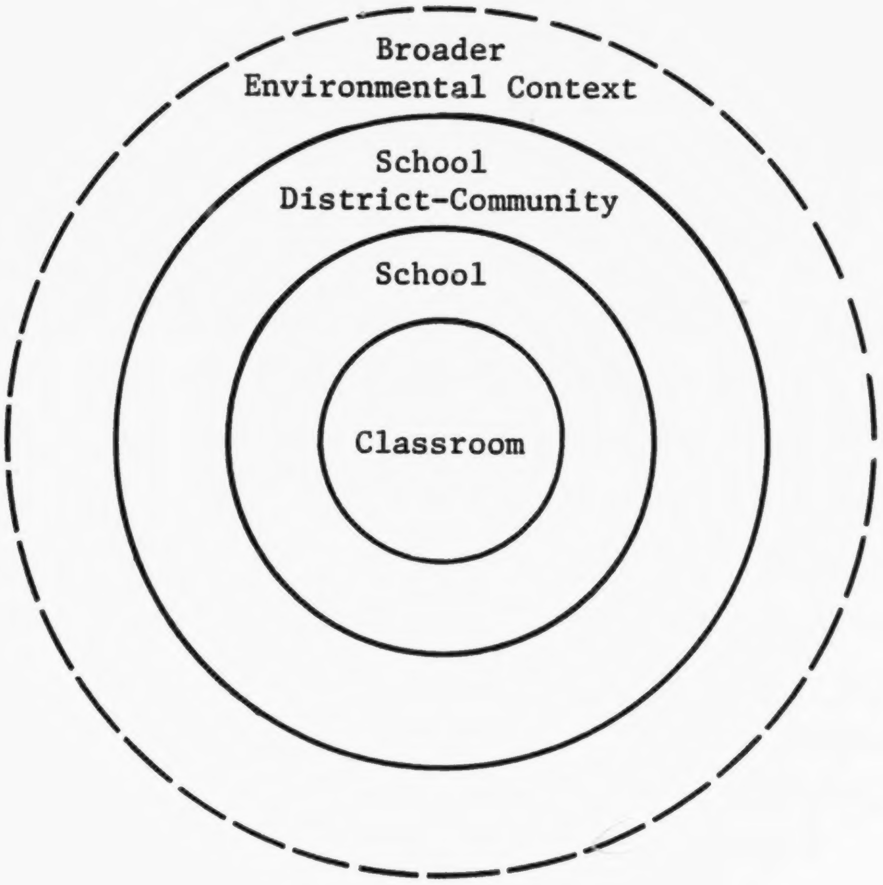
B. THE ENVIRONMENT FOR TEACHING

(Program 03: Richard L. Warren, Coordinator)

The essential role of this program is to contribute to the development of a school environment functionally supportive of effective teaching. We see this contribution in the form of research-tested strategies of policy and action which can be selectively utilized by school personnel. When we speak of a "supportive environment," the environment we primarily have in mind is the teacher's immediate organizational setting--the classroom and the school. The aspect of this environment which is of particular interest to us is the teacher's position vis-à-vis colleagues and principal. However much technological innovation may in the future modify the required classroom behavior of teachers, we are convinced that quite independent of such developments the traditional and persistent organizational relationships among teachers and between teachers and administrators must be restructured if the teacher is to acquire and be able to make productive use of a professional expertise and commitment.

The teacher's environment is complex and includes not only the classroom and the school, but also the school district, the community, and beyond, e.g., state education codes, federally funded programs. Hence the environment for teaching can be rendered schematically as concentric environmental settings. The particular conditions and processes which structure and influence teaching tend to stipulate the setting in which they can best be studied.

An analysis of the program at this stage in its development indicates there are clusters of research activities which are related to particular environmental settings, and which provide a basis for integrative levels within the program. The research activities directly relevant to the classroom setting include studies of: the decision behavior of different types of teaching teams (0302), the comparative effects of team and self-contained teaching on teachers' attitudes toward their students (0307), and the attitudes of teachers toward their occupation (0304). Those research activities most relevant to the school setting include studies of: the socialization of beginning teachers (0303), the comparative roles of teachers in traditional and innovative elementary schools (0305), patterns of evaluation and authority (0307), the effects of the school socio-economic character on student educational and occupational aspirations (0308), and the process of change and innovation at both the secondary and university levels (0306). The research activity most relevant to the



school district-community setting is the study of the characteristics of effective teachers and the distribution of teacher services (0309). Research on such environmental conditions and processes will lead first to definitive statements on their nature and impact, and secondly to policy recommendations whose import will be to affect a more supportive environment for teaching.

Project 0302: The Organizational Context of Teaching (Sowards, Lopossa)

This project has been completed and the data are being summarized for a final report. The study has dealt with the decision-making efficiency of elementary school teaching teams as compared to that of *ad hoc* groups of classroom teachers as well as individual teachers. It was also designed to yield data on interaction within groups engaged in the decision process. Thus the effect of such factors as the presence or absence of an appointed leader, experience working as a group, and size of group was assessed in relation to the pattern of social interaction in the decision-making behavior of the groups.

Preliminary analysis of the data indicates that performance with respect to specific tasks engaged in with colleagues is not affected by the administrative structure of the team. Whether a team-teaching arrangement is based on a collegial association or on a predetermined hierarchy makes no significant difference as far as the quality and kind of decision behavior are concerned.[1] With respect to the behavior of groups as contrasted to that of individuals, the former do exhibit certain significantly different characteristics. Groups take longer to complete problems, and among groups there are more extremes in the way they rate consequences for alternative courses of teacher action toward a teaching problem.

There are several implications to be drawn from this study with respect to further research. Insofar as the _ad hoc_ groups used in the study can be considered to resemble those in small group research, it appears that generalizations from small group research may be applicable to teaching work groups in general, since there were few significant differences between teams and _ad hoc_ groups of self-contained classroom teachers. Thus more research is needed on the type of training being given teams and the effectiveness of this training. Secondly, the assumptions in team-teaching literature regarding the superiority of team decisions appear unwarranted for the problem situation used in this study. Hence continued research is needed to assess the advantages and limitations of team teaching. Finally, where team teaching is introduced, there are some indications from the study that team size and type of leadership may be important. Exploratory research is needed, therefore, on the effects of different types of team organizations and composition on teaching.

Project 0303: _The Professional Socialization of Teachers_ (Warren)

This project was a study of the socialization experience of beginning teachers in a single school district (N=650) with particular attention to a measure of changes in autonomy attitudes.[2] The basic instrument used as a pretest and posttest measure was the "autonomy attitudes inventory," a questionnaire consisting of 18 items relating to the following areas of autonomy: curriculum, colleagues, organization, community, and students. The pretest was administered to all teachers and administrators in a large school district before the start of the 1967 school year. The posttest was administered to the teachers six months after the pretest was given. In addition, interviews were conducted with all new teachers in the sample during the months of May and June, after the posttest administration, to identify the "significant other" for each new teacher and to get measures of behavioral autonomy and job satisfaction.

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[1] Both team structure and the year's previous experience in working in teams did affect some aspects of interpersonal relations, however.

While autonomy has typically been treated as a unitary concept in studies of organization and professionalism, these data suggest that autonomy is task-specific and that it is more likely to be achieved by virtue of the teacher's personal resources or qualities (e.g., experience, reputation, prestige of subject matter) rather than by demand. Other general findings include the following: (a) organizational evaluation is a significant factor in professional socialization; (b) demands for autonomy often clash with existing attitudes of superiors; (c) satisfaction with teaching is related to satisfaction with the way tasks are allocated and evaluated; (d) personal liking between teachers and their evaluator is a significant socialization variable; and (e) new teachers want more control and guidance in such areas as discipline and clerical tasks and more autonomy in such areas as curriculum content and teaching method.

The results of the study indicate a need for less emphasis on general value orientations and more on the nature of specific work tasks in research on teaching as a profession. The attempt to measure autonomy attitudes in terms of a desire for "active" involvement in decision-making versus an "inert" acceptance of directives from others proved useful, and the autonomy attitudes inventory discriminates well between groups of teachers. The results also suggest a need to examine more closely the way in which beginning teachers in an organization are evaluated, e.g., the allocation of appraisal rights over newcomers, the authority-legitimacy relationships between evaluators and beginning teachers, and the effects of evaluators on professional attitudes, on instability within the organization, and on attrition rates in the ranks of beginning teachers.

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[2] The results are reported in D. E. Edgar, Professional socialization and teacher autonomy. Unpublished doctoral dissertation, Stanford University, 1969.

One clear implication is that educational administrators cannot ignore the importance of evaluation in changing teacher attitudes. Supervision without overtones of evaluation is probably impossible, since bureaucratic office and authority imply some appraisal rights. Given this fact, it may be wiser deliberately to structure evaluation patterns in order to change teacher behavior more effectively. Teacher trainees and new teachers could perhaps choose their own supervising teacher who would be paid to evaluate their teaching. In this way both "power," or the ability to sanction, and "affect" (liking for the evaluator) would be taken advantage of in socializing new teachers in desirable directions rather than simply allowing "power" to act, regardless of whether the direction of influence is desirable or not. It may be possible to build these variables into some form of acceptable colleague control, adding legitimized power to mutual liking and respect.

Project 0304: Attitudes of Teachers Toward Their Occupation (Heath)

This project is based on the assumption that the attitudes of teachers toward their occupation will relate to their job satisfaction and tenure as teachers. Its purpose is to develop six scales investigating such attitudes; the scales are job security, financial reward, social contributions, status of occupation, creativity, and conformity. The collection of data has been completed and analysis is under way. The population of teachers used in this project is the same as that used in the study, "Professional Socialization and Teacher Autonomy" (0303). Hence a next step will be to make a correlational study between the two sets of data, with particular attention to the relationship between beginning teachers' attitudes toward their occupation and changes in their attitude toward autonomy after the first year of teaching.

Project 0305: Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools (Warren)

The aim of this project is a comparative analysis of the role of the elementary teacher in traditional and innovative schools. The methodology of the project is primarily participant observation supplemented by interviews, questionnaires, and other relevant data-gathering techniques. A case study of a traditional elementary school is nearing completion.

A preliminary analysis of the data points to some general characteristics of the school and the teacher's role. In anthropological terms the school is seen as a cultural system under strain, a system which copes only haphazardly with the internally and externally induced value conflicts. These conflicts appear to be an integral part of the teaching experience, but since the system does not function adequately to help the teacher resolve such conflicts, the teaching role is seen as relatively isolated. The teacher must develop her own adaptive responses to all levels of her occupational experience: ideological, organizational, and interpersonal.

Theoretical developments are concerned primarily with a conceptualization of the teaching experience which reflects the complex and diverse characteristics of teaching as an occupation. In the course of this project a typology of "teacher encounters" has been developed for use in ethnographic studies of the teaching experience.[3]

Project 0306: Organizational Change: The Study of Innovations in Educational Institutions (Baldridge, Knight, Gorth)

The two studies in this project focus on innovation and change processes in educational institutions. One study (Knight, assisted by William P. Gorth) seeks to construct a comprehensive description of the decision-making processes that leads to or blocks major changes in secondary schools. Data have been collected from 20 Bay Area high schools and are now being analyzed. A second study (Baldridge) focuses on the various subsystems of the university organization. This study is in the planning stage and progress is being made in clarifying basic theoretical issues.

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[3] Warren, Richard L., Teacher encounters: A typology for ethnographic research on the teaching experience, Research and Development Memorandum No. 45, March 1969.

Project 0307: The Teacher in the Authority Structure (Cohen, Dornbusch, Meyer, Scott)

This project includes a series of studies on specific problems. One study (Meyer, Cohen) examines the effects of differences among schools (in their rates of interaction among teachers) on teacher attitudes toward their students and their jobs. This is done by comparing data on teachers and schools with team teaching and physically open classrooms with data on teachers in more traditional schools. A second study (Scott, Dornbusch) involves development and testing in the school setting of a general theory of organizational evaluation and authority. A third study (Dornbusch, Scott) involves the empirical assessment of the way specific teaching task performances are evaluated in elementary schools and the consequences for teacher orientations of different modes of evaluation.

Because these studies are in various stages of data collection, no findings can be reported as yet. Essential to the project are several specific theoretical developments, including an attempt to reconceptualize the professional-bureaucratic distinction as it applies to teachers, an attempt to specify a series of dimensions along which teachers may be oriented to their students, and the development of some speculative propositions concerning the impact of various structures of collegial interaction on the role orientations of teachers.

Project 0308: The Social Context of Teacher-Student Relations (Alexander, Meyer, Wallin)

This project consists of the following studies: (a) a comparison of family and school effects on the educational goals of secondary school students (Wallin); (b) an examination of high school effects on student perceptions of the occupational structure (Alexander); and (c) a study of college effects on occupational intentions (Meyer).

These studies are in various stages of planning and data collection. Preliminary analysis of some of the data indicates that at the high school level parental aspirations for their children (as opposed simply to parents' social class or education) have major effects on their children's educational goals, effects far greater than any school-to-school variations in student goals, and that at the college level, characteristics of schools seem to have very small effects on student occupational-educational goals. With respect to the latter preliminary finding, it appears that to some extent smaller colleges may raise such aspirations more than larger colleges or universities.

Several theoretical developments have been important in the planning stage of these studies. One development has concerned some ideas and research plans about the ways in which student self-conceptions might be affected by their conceptions about the role (and status or identity) of their teachers. Students' pictures of their own motivation and interest in their work may be affected by the degree to which positive aspects of these dimensions are seen as appropriate by the teacher. A second development centers around the hypothesis that the contextual effects (in essence the socioeconomic character of the school) may be peculiarly weak in the American educational system because of the formal equality of schools at any given level in this system. The hypothesis points to the importance of comparative research in this area in order to analyze as a significant aspect of schools the different legal and social positions formally accorded their graduates.

Project 0309: Characteristics of Effective Teachers and the Distribution of Teacher Services (Levin)

The aims of this project are to determine the characteristics of effective teachers, to examine the present distribution of those characteristics among students by race and social class, and to establish ways of improving the selection and distribution of teachers. The project involves initially a reassessment and study of data from the survey of equal opportunity of the USOE (the survey on which the Coleman Report was based).

In one study in which teacher characteristics are related to student achievement and then combined with data on the cost of obtaining teachers with different characteristics, the research findings suggest that recruiting and retaining teachers with high verbal scores is five to ten times as effective per dollar per teacher expenditure in raising achievement scores of students as a strategy of obtaining teachers with more experience.[4] A second study, an analysis of the financial implications of shifting the governance of inner-city schools from central school boards to community control, suggests that the distribution of schooling resources is directly related to the distribution of wealth and power among the population that is being served both among and within school districts.[5] Ethnic minorities and the poor are seen as having been traditionally shortchanged in the provision of social resources.

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[4] Levin, Henry M., Cost-effectiveness analysis and educational policy--Profusion, confusion, promise, Research and Development Memorandum No. 41, December 1968.

[5] Levin, Henry M., Decentralization and the finance of inner-city schools, Research and Development Memorandum No. 50, May 1969.

C. TEACHING THE DISADVANTAGED

(Program 04: Robert W. Heath, Coordinator)

The Center's Second Annual Report (April 1968) stated the need for a program of research and development in the teaching of the disadvantaged. The first year's experience in the new program, which began its operations in July, 1968, has served to intensify our awareness of the need and importance of such a program.

Objectives

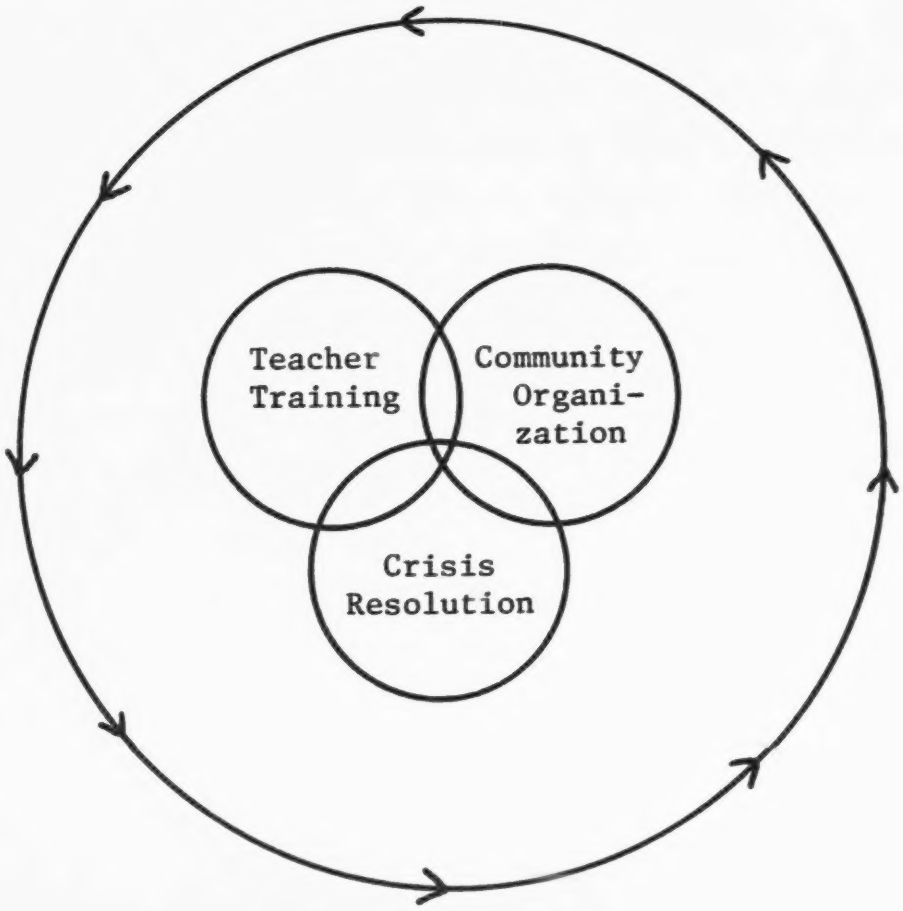
The objectives of this program are to generate useful information which will improve the training of teachers of students in minority or poverty communities; to identify teacher skills needed for crisis resolution; and to develop information about the function of teachers as change-agents of the educational institutions in which they serve.

More specifically, the program seeks to document the self-defined educational needs of disadvantaged communities, to identify changes in the educational system that are truly responsive to these needs, and to identify and develop the strategies and tactics necessary to implement the required changes.

The program's product goals include the development of materials for teachers designed to (a) develop skills in adapting the curriculum to the needs of disadvantaged students; (b) help teachers employ techniques that more effectively engage the student in his own education; (c) prepare teachers to deal with crisis situations in constructive ways; and (d) prepare teachers to function as representatives of both the community and the educational professions in bringing the substance and structure of education closer to the needs and aspirations of the communities served.

Strategy

Each project within the program has its own strategy and research plan. The diagram on the following page represents three fields of activity that now provide a conceptual structure for the program's research and development activities. As the figure suggests, these three fields are by no means independent. The research activities, professional interests, and allocations of staff time in the three fields of activity overlap. We find that in the first year of the program, our activities have become increasingly cohesive.



Sequence of Events

In terms of program strategy, we have viewed our central problem as "the role of the teacher in the process of changing education in disadvantaged communities." When needs for change are identified and defined, either by professional educators or by the community itself, educationally sound practices and programs must be developed to meet these needs. Sometimes crisis situations in the classroom, in the school, or in the community bring the needed educational changes into focus. On the other hand, the very process of introducing change may create conflict and tensions that must be dealt with constructively if the change process is to yield improvement rather than damage. When communities find means of expressing their educational needs from a base of power in organizations, they also find themselves able to facilitate the introduction of constructive changes and to participate in the productive resolution of crisis involving the schools.

Teachers in schools serving disadvantaged communities are more likely to encounter crisis situations than are those serving schools representing the middle-class dominant culture. Undoubtedly this is due in part to the despair and social ferment in those communities. When changes are introduced in response to the needs of these communities, the alteration of conventional processes is likely to result in conflicts on at least four levels:

(1) at the interpersonal level (e.g., between individual students, between student and teacher, between teacher and administrator);

(2) at the small-group level (e.g., small groups of students in the classroom and on the school grounds, small groups of parents in conflict with teachers or administrators);

(3) at the large-group level (e.g., school boycotts, sit-ins, demonstrations, school board meeting demonstrations);

(4) at the community level (e.g., school board elections, unification elections, desegregation moves).

A realistic teacher-training program, then, must recognize the specific needs and characteristics of disadvantaged communities, identify conflict areas and methods of crisis resolution, and reflect the importance of community participation in solving educational problems.

Changes in the Program

On July 1, 1969 Professor Robert D. Hess succeeded Dr. Robert W. Heath as coordinator of the program. Dr. Heath will continue to direct the project on Educational Community Organization.

It has become increasingly apparent that the source of educational failures in minority and poverty communities is to be found in the more affluent, dominant, white society. Moreover, the social, political, and economic power to remedy these failures is most frequently available in the dominant culture. Accordingly, the program's future efforts are likely to place greater emphasis on the roles of teachers, serving in all types of schools and not just those in disadvantaged communities.

One of the critical needs in programs intended to contribute to the education and training of teachers of disadvantaged children is to keep informed about new developments in the field. To this end, support for a curriculum specialist was provided in the budget for the current fiscal year. Such a specialist will shortly be added to the staff and will be assigned the task of accumulating and organizing data on new approaches and curricula relevant to the goals of the program. This specialist will summarize current practices for (a) training teachers to work with disadvantaged children, (b) multicultural programs intended to inform and change attitudes in white communities, and (c) procedures for parent involvement in educational programs for small children (especially Head Start and Follow Through).

The following descriptions summarize the highlights of the five projects in the program, grouping them under the three fields mentioned above.

Community organization

The project on Educational Community Organization (0401), directed by Robert Heath, has been a focal point of activity in the program since its inception. It is designed to find more effective means for communities to influence their educational institutions. Teachers, citizens, and professional educators are seen as particularly critical to the attainment of this goal.

The staff of the project is using several strategies to contribute to the overall objectives of the program. One of these is the writing of a manual for use in training teachers and interested citizens in educational community organization work. The manual will be based on the extensive logs, videotapes, and other records developed by the staff as its members served as participant observers in a minority-group community near Stanford. These activities have involved not only the regular project staff but also faculty members or students from the Stanford School of Law, School of Business (through Vista volunteers), News and Publications Service, and the Secondary Teacher Education Program (STEP) as well as other courses in the School of Education. The manual, with appropriate audiovisual aids, is expected to assist in the preparation of teachers and interested citizens to achieve changes responsive to the needs of communities served by schools.

In another phase of the project, the staff is exploring the lines of communication and access to information open to private citizens in four school districts in the Bay Area. These private citizens have been asked to request copies of their school districts' Title I Compensatory Education proposals. The responses of the school district and the various steps involved in obtaining these public documents are being recorded as evidence of the difficulty of this type of relationship between the community and the school.

Another component of the project is the attempt to ascertain through interviews with black parents and white parents, black students and white students, and teachers working in corresponding schools, the views of members of the community about the needs for educational change in the schools in which they are involved. One set of tape-recorded interviews has been reproduced (with appropriate consent) as a transcript,[1] with one of these interviews also available as an audiotape distributed by the Center.[2] Other interviews are being prepared for dissemination. These direct statements of needs as seen by the participants in the school systems will help identify the needs of the school and the different perspectives that members of the educational community have of the tasks with which the school should be concerned.

Project staff members are also studying the behavior and characteristics of teachers that facilitate their ability to relate to both black and white students. High school students were asked to rate videotapes of teaching interns and to indicate which teachers they thought had the ability to relate well to them. Students in the schools were also asked to help identify behaviors of their own teachers that appear to contribute to this ability to relate well with students. Analyses of the study of teachers' ability to relate to students will be reported in subsequent technical reports of the Center.

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[1] Roy, L., & Heath, R. W. Interviews with four black parents. Stanford Center for Research and Development in Teaching, Research and Development Memorandum No. 37, September 1968.

[2] Tomorrow Never Comes. Thirty-minute taped interview with a black parent, dealing with his and his children's educational experiences, values, and attitudes. Stanford Center for Research and Development in Teaching. Price $3.25.

The relationship of this project to the overall goals of the program is clear, but another implication that is not quite so obvious is the need to develop educational community organizations in white middle-class populations. It is in these white middle-class areas of society that changes in attitudes are needed in order to help ameliorate the educational problems of disadvantaged children.

Projects oriented toward crisis resolution

Project 0404, Use of Small Groups in a Changing School, under the direction of Frank Hawkinshire, is oriented around the development of techniques which will encourage and train small groups to identify specific problems which they see in the school, to help them develop plans, methods and procedures that might be effective in solving these problems, to draw up ways to implement plans, test their feasibility and incorporate them into the ongoing life of the school.

This project is based in a recently integrated high school in which there has been some tension between the small number of Negro students and the larger population. The difficulties that emerged have involved the students, school staff, and many members of the community, and it is the aim of this project to help develop ways to bridge some of the many cleavages which exist, primarily through increasing the effectiveness of participants--especially parents and students--in the problem identification and solving process. The project will also develop a list of critical situations in this school which may be expected in other schools with comparable problems.

Small groups were formed from each of the following groups: parents, administrators, teachers, and students, with various interrelationships among the groups (teachers who nominated students also formed their own group, parents of the students nominated for group participation formed a group, etc.). These relatively homogeneous groups met at separate times throughout the initial six-week period of the project. Although heterogeneous groups had been planned, these groups did not meet. The groups were helped to identify 16 factors that should be considered in solving a social problem, i.e., focusing on a target, discovering and finding ways of coping with resistance to change, gathering data necessary to make decisions, etc. Various exercises were devised to help the groups put into practice ways of working on social problems. Once the groups were familiar with the problem-solving model, they merged into task groups around specific problem areas selected from the combined list developed by all of the participants; members of each of the initial groups were free to select the task force in which they became involved. The outcome of their work was to develop procedures to cope with the problem that they had selected. Examples would be: proposed time schedules, changes in code, in school rules, and the like. Implementation strategies (plans, feasibility tests, and action) were to be carried out by either the original task force or an ad hoc group.

The relevance of this project to the goals of the program for Teaching the Disadvantaged is obvious: It deals with the emergent problems of confrontations within schools and with conflict between various segments of the school and the community, and is particularly relevant to any attempt to learn more about the nature of confrontation situations and ways of coping with them. It is, of course, those communities which include disadvantaged children that are likely to have frequent experiences of this kind.

At this point the data of the project have not been completely analyzed and systematic findings are not available, but the observations by the research staff indicate that the effectiveness of the group depends to a great extent upon interpersonal compatibility as opposed to common interests expressed by the members before the group begins to function. This is related to another observation, that a great deal of effort was expended in coping with interpersonal tensions that developed in the groups. In working with these groups, exercises have been developed to help them develop a common reference in viewing and analyzing problem-solving processes. The experience is also designed to contribute to social diagnostic skills. A problem-solving model has been developed to help make explicit the process which the groups follow when they attempt to deal with their chosen problems.

A monograph describing the project and specific findings is in preparation. A manual of exercises and activities of group meetings will also be prepared.

Projects oriented toward improvement in teacher training

The significance of language and language training in the education of disadvantaged children has been a prime topic of research and action in the last few years. The present activity in this Center's program is directed by Robert L. Politzer and involves a project (0402) designed to complete a syllabus to be used in the training of teachers of pupils who speak nonstandard English (specifically Negro dialects or "Mexican-American" English, and who are learning standard English as a second dialect.

The steps planned in the development of this syllabus include first, a survey of materials dealing with nonstandard English; second, development of descriptions of nonstandard phonology, morphology, syntax, and comparison with standard forms; third, development of a description of teaching behaviors to be used in teaching standard English. A search of existing materials on English spoken by Mexican-American pupils showed a general lack of reliable linguistic data.

A number of materials have already come from this project. They include memoranda on problems of applying foreign language teaching methods to the teaching of English as a second dialect (Politzer, R&D Memorandum No. 40) and on standard English and nonstandard dialects: phonology and morphology (Politzer and Bartley, R&D Memorandum No. 46). The next memorandum, on the elements of syntax in standard English and nonstandard dialects, is awaiting final editing.

The relevance of these materials and the activities of this project to the overall program and to the teaching of disadvantaged students is obvious and needs no elaboration.

The programmatic concern with teacher preparation is reflected in another project (0405) involving small groups. This study, directed by Frank Hawkinshire, is oriented around the use of these units to assess the learning experiences of students in a professional education course. It deals with questions of the sources of influence on students' concepts of teachers' roles and the factors that appear to enhance the relevance of the course to a student intern's experience. The project is ultimately intended to develop an experimental course and to design a preservice training program based on the elements that are found to be most important in the preliminary work.

The content focus of the course in question is in the application of social interaction theory to the classroom situation. Students participate in a variety of activities requiring them to work in dyads, in small and large group settings. These are then assessed by the students in various ways. The students plan, design, and carry out systematic observations of the class and its subgroup learning teams and the instructor maintains a set of ratings of the performance of both individual and group members in the class, in addition to the journals kept by the students.

The relevance of this project for the program lies in the importance of developing active modes of inquiry for disadvantaged students. Basic research into how teachers acquire skills of inquiry will make it possible to apply these principles to the teaching of disadvantaged children. This point of view assumes that the process of teacher as learner is one that involves undergoing a major role change and that similar role changes in the role of pupil may be involved in the learning and teaching of disadvantaged students.

At this point the data are in process of analysis and results are not ready to report. A set of workable exercises and tasks has been devised for the course. Activities that prove to be effective will, of course, be retained and modified for further development. It appears from observations by the research staff that students respond very differently to various aspects of the class, and one of the points of analysis will be to attempt to record these differences and determine their relationship to learning in the various situations involved. A set of manuals is being prepared which will describe the training design for teacher training programs. There is currently almost nothing existing in materials and methods of teacher training in this particular field. Although many efforts have been made, they do not provide an adequate theoretical framework with strategy for implementation.

Another project involving small groups is one which is designed to develop problem-solving skills in disadvantaged students. The original goal was to examine the effects of a learning-by-teaching treatment (sixth graders teaching first graders) on the sixth graders' ability to solve problems. This study (0403) is directed by Robert H. Koff. The project began with observations in two sixth- and two first-grade classrooms, to get acquainted with teachers and students, and testing the sixth graders on problem-solving aptitudes (general reasoning ability, fluency, flexibility). During the latter part of the year, both individual and group testing were carried out and some of the data analysis was completed.

The relevance of this project to the overall program goals lies in its utilization of students from an integrated school which has an enrollment of more than half Negro, some of whom have not been making satisfactory academic progress.

Following initial division of the classrooms into experimental and control units, small group activities were instituted which involved the experimental groups in problem-solving tasks. It was found that the experimental subjects were higher than the control group on the four problem-solving skills (problem sensing, problem defining, generating alternative solutions, and foreseeing consequences) though significantly so only for problem defining). Although it was hypothesized that there would be more role diversification within the experimental small groups, this turned out not to be the case. However, the product quality based on analysis of group interaction was higher for the experimental group than for the control group. This indicates greater cooperation among members and a higher incidence of contribution from all members to the solution.

Two criterion tasks were developed using a model sixth-grade classroom to test the problem-solving skills of students. In one of these, called the unstructured task, subjects arranged the classroom as they would have wanted it were they the teacher. They were asked to explain their solution and to indicate what problems people might have who worked in their own design. In the second, more structured task, the room was arranged by the examiner with numerous built-in problems (teacher's desk was blocking the door, there were not enough chairs for all the desks, etc.). The subject was to describe the problems he could find, rearrange the room and explain his reasons for doing so.

The group problem-solving task involved situations in which groups of four subjects were asked to design a playground for kindergarteners and first graders, using pictures of playground equipment, crayons, large pieces of chalkboard, etc. When it was completed, each subject was interviewed as to his satisfaction with the group's operation and product, his perception of who in the group had contributed most in various ways and the group's rationale for placing the equipment where they did. In addition, the quality of the product ratings along four dimensions (safety, utility, aesthetic appeal, and group interaction) were also obtained.

Problems associated with developing cohesive groups within which to promote problem-solving activities required so much staff and student attention during the year that the tutoring of first graders by sixth graders became a secondary concern. This suggests that tutoring should have been postponed until after group cohesiveness developed.

A slide and audio tape description of the project has been prepared.

D. NONPROGRAMMATIC RESEARCH

Project 0602: The Impact of Educational Technology upon Noncurricular Dimensions of Children's Behavior: A Study of the Computer as a Socializing Agent (Hess, Tenezakis)

The project aims at understanding the non-intellective effects of educational technology upon children's attitudes and orientations toward machines as compared to other, more "traditional," sources of information and "authoritative" answers, such as the teacher and the textbook. Previous research suggests that the child's modes of processing information are contingent upon his attitudes and orientations toward authority, the latter being structured to a large extent through his interactions with human sources of authority. The introduction in schools of computer aided instruction may affect both the child's attitudes and beliefs regarding authority and his modes of processing information (e.g., attending to details, expecting feedback, checking the information obtained, etc.).

The initial phase of the study, while exploratory and descriptive, also has to do with concepts on the properties of authority figures. The main objectives of this phase are: (a) to obtain information about the child's image of the computer as compared to other sources of learning, such as the teacher, textbook, and television; (b) to obtain information regarding social and cultural variables which affect the child's image of the computer.

Data collected in January and April 1969 through pilot interview procedures were used to develop research instruments, namely, a structured questionnaire and a more comprehensive interview schedule. Data collected from the first full-scale administration of the questionnaire to 184 junior high school students (CAI and non-CAI) students in the same classroom groups) are now under analysis. Ten percent of these students were also interviewed. It is expected that results will be available by August, 1969. These same data will be used for further methodological developments and instrument refinements.

A report on the findings of our first exploratory study will be ready by October, 1969. This report will include discussion of possible implications for education and plans for further research.

E. EARLIER PROJECTS

Project 0102: Technical Skills of Teaching: Explaining (Gage)

A final report on the first stage of the project, Explorations of the Teacher's Effectiveness in Explaining, by N. L. Gage, Maria Belgard, Daryl Dell, Jack E. Hiller, Barak Rosenshine, and W. R. Unruh, has been completed and issued as Technical Report No. 4.

Next steps will be considered when the principal investigator returns from his sabbatical and is able to engage in planning discussions with his co-workers.

Project 0103: Technical Skills of Teaching: Foreign Language (Politzer)

This project was concluded during the academic year 1968-69. It produced Technical Reports 1, 1A, 2, and 5 of the Center. Report 1A consisted of a detailed description of performance criteria for foreign language teachers. In Reports 1 and 2 these performance criteria were combined with an outline of applied linguistics of French (Report 1) and Spanish (Report 2), a bibliography of applied linguistics, and microlessons to illustrate the practical application of pedagogical and linguistic principle.

Technical Report 5, published in April, 1969, dealt with a research effort concerned with ascertaining the characteristics and behaviors of successful foreign language teachers. The research attempted to study the effects on the pupil of some of the teaching behaviors described in Technical Reports 1A, 1, and 2. The principal method employed consisted in observation of videotaped classroom performances of 17 French teachers and in relating observational data to achievement of the pupils. The main conclusion reached by the study was that teachers who are flexible and vary classroom procedures according to the needs of the pupil are more successful than teachers who adhere rigidly to the same procedures over prolonged periods of time.

Project 0202: Teachers' and Pupils' Cognitive Preferences in Mathematics (Heath)

This project is directed toward measuring cognitive preferences on both sides of the teacher-learner process, and to studying possible interactive relations between the two. It is first hypothesized that people (both students and teachers) differ reliably in their preferences for modes of mathematical expression. Some persons prefer to think of numbers as points on a line, for example, while others are content to deal primarily with symbolic expressions of number--numerals. The mathematics teacher continually makes choices as to what forms of expression to employ at a given time in the instructive process. Suppose then that the teacher knew the predominant preference of his pupils and the preferential "address" of the topic he was about to teach. Presumably, he could select a corresponding mode of teaching the mathematical concept and attain maximum learning. The question is: Does such an effect really exist and if so, is it substantial enough to be of educational importance?

An instrument, the Cognitive Preference Inventory, was developed to measure such differences. Three a priori modes of expression were specified: verbal, symbolic, and graphic.

The trial form of the student inventory was pretested in the spring of 1967.[1] The sample consisted of 115 seventh-grade students (69 males--46 females) from a junior high school in Fremont, California.

The purpose of the study is to test the interactive effects of (a) teaching mode, (b) pupils' cognitive preferences, and (c) subject-matter topics (categorized by cognitive preference) and pupil achievement. In tabular form, the experimental design appears as follows:

TABLE 1

Study Plan

		Teaching Mode								
		Verbal			Graphic			Symbolic		
		Students			Students			Students		
		Verbal	Graphic	Symbolic	Verbal	Graphic	Symbolic	Verbal	Graphic	Symbolic
Topic	Verbal									
	Graphic									
	Symbolic									

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[1] Travers, K. S., Heath, R. W., & Cahen, L. S. Preferences for modes of expression in mathematics. Research Memorandum No. 7, Stanford Center for Research and Development in Teaching, May 1967.

In effect, the plan is to be repeated four times, each time with a different set of three topics; thus there would be 12 topics in all; four verbal, four graphic, and four symbolic. Students are to be randomly assigned to cells. Students would view a film on a given topic in a given mode, then write an achievement test on that topic. Cognitive preference scores on each student would also be available.

Thirty-six filmed lesson embodying three teaching modes have been produced. A brief (12-item) achievement test for each of the 12 topics has also been developed.

Through the cooperation of Humboldt State College, arrangements have been completed for gathering the final data in September of 1969.

F. SUPPORT SERVICES

Project 0701, Publication and Dissemination

(Bruce Harlow, Coordinator)

The Center meets its publication and dissemination responsibilities in various ways. At a number of places in the present report mention is made of publications and other products currently under development within the various projects. A basic list of publications, films, and audiotapes issued by the Center since its inception appears on pages 68-72. Synthesizing publications developed during the current year appear on that list and are mentioned elsewhere. The Publications and Dissemination Unit has also recently completed an updated list of Center publications, including Center-related books, journal articles, and doctoral dissertations, which is more comprehensive than any list previously made available.

During the year members of the Center delivered papers or chaired symposia at professional society meetings, most notably at the annual meeting of the American Psychological Association and the American Educational Research Association, but also at a substantial number of other professional society meetings and special conferences. When appropriate, these papers appear as Center publications.

The Center continues to receive a heavy flow of requests for its publications. With the basic distribution list increasing monthly, the Unit is now wrestling with the problem of duplicating adequate numbers of its publications to cover the period until they are available through the ERIC system and yet remain within the limits imposed by federal regulations on the number of units which may be duplicated. Announcements of new publications, including an abstract, now go to a larger mailing list with the explanation that while the initial supply lasts, single copies will be sent without charge upon specific request. This procedure helps to ensure that those receiving copies have a particular interest in the subject. Given federal limitations on number of copies produced and its policy of not charging for publications, the Center has not found it possible to solve the problem of "standing orders" from libraries and other institutions. The Dissemination Coordinators of all the R&D Centers as a group are investigating the possibility of combined mailing lists as an aid to better dissemination, but this procedure is still in the exploratory stage.

Following a suggestion from the Center's Contract Officer at the Bureau of Research, Center publications now contain abstracts in addition to the Publication Resumes forwarded to the Bureau for use as part of its information base dealing with the Center.

Visitors to the Center continue to represent not only most of the 50 states but also every one of the world's continents. Through these contacts knowledge of the Center's work is extended. Upon request, visitors are placed on the Center's mailing list to ensure a continued flow of information.

The Unit has added an Assistant Editor, Mrs. Mary E. King, who has contributed greatly to the effort to maintain the Center's standards for style and quality of exposition in its publications.

Project 0702, Advisory Panel

The members of the Center's National Advisory Panel, whose names and affiliations are listed elsewhere in this report, met for the first time with Center staff on March 10 and 11, 1969. This meeting produced a searching and most helpful discussion of the Center's activities and problems. A report on the meeting, which has been circulated among the participants, summarized the substantive questions raised and the procedural plans for the next meeting, which is expected to be held during the late fall of 1969. It is anticipated that future meetings will prove increasingly fruitful.

Project 0703, Educational Media Unit

(Bruce Harlow, Coordinator;

Hugh A. McAllorum, Educational Media Specialist)

The services of the Educational Media Unit are available to all of the staff of the Center. Although its largest single client is Project 0503 on Microteaching and Intern Data Bank, the Unit provides videotaping and other audiovisual services for research in a number of other Center projects.

During the past year the Unit secured the services of a full-time Educational Media Specialist (Mr. Hugh A. McAllorum), who replaced two

Center Research Assistants who had previously been responsible for the Unit. As in the past, the Unit will continue to be staffed with part-time TV operators and audiovisual assistants, most of whom are undergraduates at Stanford. Experience has proved that the new arrangement, centering operating responsibility in a full-time experienced specialist, has made for greater efficiency.

During the year the Unit has acquired two battery-powered, hand-carried one-half inch units consisting of a combined camera and videotape recorder. These units, although they do not possess all the capabilities of one-inch equipment, have provided greater flexibility in on-site recording and particularly in the recording of extramural behavior related to education. The Educational Community Organization project (0401) has found these units particularly helpful in recording activities in which it is interested. Funds have been authorized for the purchase of additional one-half inch units of this type, together with other videotaping equipment which will update and strengthen the unit's capabilities.

The Unit has begun an intensive review of the desirability of retaining existing videotapes in its videotape library. Many of the existing tapes are important in connection with the Intern Data Bank portion of Project 0503. An objective during the next several months will be to determine which Center videotapes may be of sufficient quality to justify the preparation of supplementary written material and making the tapes available for dubbing by other educational users. The Unit is also planning a revision of the demonstration videotape describing the Center and microteaching which was prepared in 1968.

Project 0704, Methodology Unit

(Janet D. Elashoff, Coordinator)

The Methodology Unit is responsible for assisting other Center projects with research planning, data analysis, and computer data processing.

Staff members consult with Center projects, conduct methodological research, and maintain and develop a social science computer program library. They are currently carrying out inquiries into regression with serial correlation, dichotomous response problems with missing data, outlier problems in regression analysis, and a reanalysis and methodological criticism of Rosenthal and Jacobson's Pygmalion in the Classroom.

Preliminary investigation of estimators of the difference and ratio of two binomial probabilities when data are missing indicates that the estimator which allows estimation of the probability of missing data may not be appreciably better in small samples.

The reanalysis which Elashoff and R. E. Snow have conducted of the Rosenthal-Jacobson study provides a methodological case study for experiments with similar data problems.

Problems arise in the analysis of repeated measurements data because successive observations may not be independent. A memorandum will soon be available which contains a survey of the literature on the problem of serial dependence and a survey of suggested estimation procedures for regression models involving serial correlation.

The relationships between outlier problems and missing data problems, censoring and truncation problems, errors of measurement problems, and misclassification problems have been explored. Some models for nonrandom outliers in linear regression have been suggested.

The computer program library continues to be updated and revised. New programs to prepare design cards for BMD05V, to compute a confusion matrix, to evaluate estimators for dichotomous data with missing observations, and to compute regressions with serial correlation have been developed. A small program library for the Olivetti is now being developed.

The Unit has continued to provide consultation services on research design and analysis and to handle the details of computer-based data processing for the Center. Projects given special help were Organizational Context of Teaching (Sowards, Lopossa), Professional Socialization of the Teacher (Warren, Edgar), Organizational Change: The Study of Innovations in Educational Institutions (Gorth), Training Studies (Snow), and Uncertainty Studies (Sieber).

IV. SUPPLEMENTARY INFORMATION

A. CENTER GUIDELINES

Guidelines for the Organization and Operation of the Center

March 1968

Introduction

The organization of the Center consists of the following major components:

I. Officers
II. Executive Board
III. Advisory Panel
IV. Research and Development Associate Staff

I. Officers

A. Composition of Component

The officers of the Center shall consist of (a) a full-time Director of the Center and (b) a Chairman of the Executive Board, who are appointed by the Dean of the School of Education and serve at his pleasure; (c) Coordinators of the major program components in the Center, appointed by the Director in consultation with the Research and Development Associate Staff; (d) an Administrative Officer who is appointed by the Director and serves at his pleasure; and such other administrative personnel as the Director may designate.

B. Duties, Responsibilities, and Organizational Features of the Component

1. The Director is responsible under the terms of the principal and related contracts for supervising the work of the Center to assure that the terms and conditions of all contracts are met. He shall initiate proposals for action on matters of policy, program, personnel, projects, and budget. The term "initiate" here signifies merely the formal aspect of initiation; the Center encourages informal initiative, in the form of

suggestions and recommendations, by all persons concerned with the Center. It shall be the responsibility of the Director to receive program and project proposals from Center Staff and from outside, to react to these, and to pass them on with his recommendations to the Executive Board for their consideration. The Director shall also implement the Center's policies and actions relating to program, personnel, and budget (a) by allocating personnel and funds according to the general plans adopted by the Executive Board, (b) by making appointments of Research and Development Associates with the advice and approval of the Executive Board, the Dean, and other University officials as required, and (c) by formulating the budget for the approval of the Executive Board and controlling expenditures accordingly. The Director shall be responsible for preparing the periodic reports to the U. S. Office of Education and other agencies requiring them, making use of the progress reports of the various project and program leaders. He shall perform any other functions not herein designated to another group or individual. He may delegate such of his functions as may from time to time seem desirable, while continuing to retain the ultimate contractual responsibilities mentioned above.

2. The Chairman of the Executive Board is responsible for coordination of the review and planning of the research and development work of the various program components of the Center. Specifically, he shall chair regular meetings of the Executive Board at which (a) the Director's proposals for action on matters of policy, program, personnel, projects, and budget will be considered, (b) progress in various program components and projects will be reported, reviewed, and evaluated, (c) desirable revisions of ongoing research and development projects will be formulated, and (d) plans for new programs and projects will be adopted.

3. The Coordinators of each of the various program components shall be responsible to the Director for implementing the research and development policies and programs established by the Executive Board. Specifically, each shall be responsible for (a) defining and clarifying the objectives of his program component, (b) relating the work of that component to the other components and to the goals of the Center, (c) assigning and coordinating the personnel allocated to that program component, and (d) reporting periodically in writing on the work of the program component.

4. The Administrative Officer shall be responsible, in the operation of the Center, for carrying out the duties assigned to him by the Director. He shall act as secretary to the Executive Board and the Advisory Panel.

II. Executive Board

A. Composition of Component

The Executive Board shall consist of the Chairman of the Board, the Director, the Administrative Officer, ex-officio, as secretary, and not more than six professional staff. These members shall be appointed annually, in June, by the Director after consultation with the Research and Development Associate Staff. They shall normally be the Coordinators of the major program components of the Center, with at least one who comes from outside of the Staff of the Center.

B. Duties, Responsibilities, and Organizational Features of the Component

The Executive Board shall be responsible for formulating the goals of the Center, for establishing general policies and programs in harmony therewith, for reviewing and evaluating the progress of the various program components, for approving the appointment of professional personnel, and for adopting the budget. It will normally (a) meet once per month for two-hour sessions at a regular time, (b) have agenda prepared by the Administrative Officer, in consultation with the Director and the Chairman, distributed in advance, with supporting documentation, (c) meet with the Advisory Panel, (d) assist in policy interpretation and implementation, and (e) keep minutes of its meetings and distribute them to the Research and Development Associates. It shall create and ensure the effectiveness of mechanisms necessary to provide for long-range planning for the development of the Center. The Executive Board shall appoint ad hoc, or more permanent, advisory committees to the various programs of the Center as they are needed.

III. Advisory Panel

A. Composition of Component

The Advisory Panel shall consist of approximately 15 persons appointed for two-year staggered terms in June by the Dean of the School of Education upon recommendation of the Executive Board. The Dean shall annually in June designate the Chairman. The members of the Panel shall be drawn in approximately equal numbers from

1. The Stanford University community, e.g., the School of Education, the School of Humanities and Sciences, other professional schools, institutes, and the Central Administration of the University.

2. Local, state, regional, and other educational agencies, e.g., the Far West Laboratory for Educational Research and Development, Supplementary Education Centers, colleges, professional associations, the Stanford Research Institute's Educational Policy Center, state departments of education, and city and county school systems.

3. Experts in fields related to the program of the Center.

B. Duties, Responsibilities, and Organizational Features of the Component

The Advisory Panel shall normally meet twice per year for two full days (1) to review and suggest ways in which all parts of the school and University community can be effectively used in the work of the Center, (2) to review the program of the Center, (3) to assess the Center's products, (4) to suggest ways for strengthening its current operations, and (5) to call attention to pressing educational needs and possible lines of development. It shall receive all reports and publications, including the regular reports to and from the U. S. Office of Education, so that it may be fully informed of the work of the Center. The Panel shall be assigned sufficient staff to keep it informed and in other ways to assist it in the conduct of its work.

The expenses of attending meetings and an honorarium, to be established by the Executive Board, shall be paid by the Center. A written record of each meeting will be prepared and circulated to the Dean, the Executive Board, and Research and Development Associates.

IV. Research and Development Associate Staff

A. Composition of Component

The Research and Development Associates will be appointed by the Director, with the approval of the Executive Board, the Dean, and other University officials as required. The Research and Development Associate Staff shall constitute a formal body with the Director serving as Chairman.

B. Duties, Responsibilities, and Organizational Features of the Component

The Research and Development Associate Staff, and such others as they may designate, shall meet regularly at designated times to consider the work of the Center.

They shall receive and act upon matters referred by the Executive Board, suggest items for the Executive Board's agenda, and submit, either individually or collectively, written reports from time to time to the Executive Board and the Director.

They shall review the Director's appointments to the Executive Board and matters of interest to them which pertain to the aim, program, organization, and operation of the Center.

The Research and Development Associate Staff of the Center shall be appointed on the basis of two criteria: (1) their competence and its relevance to the program of the Center, and (2) their degree of commitment to the program of the Center, as reflected in willingness and ability to devote from one-third to one-half or more of their time to the Center's work.

B. PROFESSIONAL STAFF (RESEARCH AND DEVELOPMENT ASSOCIATES)

C. Norman Alexander, Assistant Professor of Sociology. B. A., Sociology, University of Alabama, 1961; M. A., Sociology, University of North Carolina, 1963; Ph. D., Sociology, University of North Carolina, 1965. General interests: Social perception and the effects on attitudes and behaviors of role relationships and normative milieux.

J. Victor Baldridge, Assistant Professor of Education and Sociology. B. A., Sociology, Lambuth College, 1963; B. D., Social Ethics, Yale University, 1966; Master of Philosophy, Sociology, Yale University, 1967; Ph. D., Sociology, Yale University, 1968. General interests: Applying sociological theories of complex organization to academic governance in universities; development of a theory of organizational change and adaptation.

Robert N. Bush, Professor of Education, Director of SCRDT. A. B., History and Political Science, Colorado State College, Greeley, 1935; M. A., History and Political Science, Colorado State College, Greeley, 1937; Ed. D., Higher Education, Stanford University, 1941. General interests: Teacher education, secondary education, teacher personnel.

Elizabeth G. Cohen, Associate Professor of Education and Sociology. B. A., Psychology, Clark University, 1953; M. A., Sociology, Harvard University, 1955; Ph. D., Special fields (social stratification and socialization of the child), Harvard University, 1958. General interests: Race and education; client orientation in teachers as a function of organizational arrangements.

Sanford M. Dornbusch, Professor of Sociology. B. A., Sociology, University of Syracuse, 1948; M. A., Sociology, University of Chicago, 1950; Ph. D., Sociology, University of Chicago, 1952. General interests: Formal organizations and social psychology.

Janet D. Elashoff, Assistant Professor of Education. B. S., Statistics, Stanford University, 1962; Ph. D., Statistics, Harvard University, 1966. General interests: Experimental design and analysis; robustness of statistical techniques to failure of assumptions.

N. L. Gage, Professor of Education and Psychology, Chairman of the SCRDT Executive Board. (On leave, 1968-69.) A. B., Psychology, University of Minnesota, 1938; Ph. D., Psychology, Purdue University, 1947. General interests: Theories of teaching; person perception; correlates in teacher behavior of effects on student achievement.

Frank B. W. Hawkinshire, Assistant Professor of Education. A. B., Criminology, University of California at Berkeley, 1957; Master of Criminology, University of California at Berkeley, 1959; Ph. D., Social Psychology, University of Michigan, 1967. General interests: Strategy and tactics of planned change; developing and implementing new techniques for training pre- and in-service teachers; training professionals to work effectively with socially disturbed children.

Robert W. Heath, Research and Development Associate, Education. B. S., Psychology, Purdue University, 1954; M. S., Psychology, Purdue University, 1955; Ph. D., Psychology, Purdue University, 1957. General interests: The social psychology of education; development of research methodology; relation of social, political, and economic change to changes in educational goals and practices.

Robert D. Hess, Professor of Child Education, Professor of Psychology. Chairman of the SCRDT Executive Board (1968-69), Coordinator, Program on Teaching the Disadvantaged. A. B., Psychology, University of California at Berkeley, 1947; Ph. D., Committee on Human Development, University of Chicago, 1950. General interests: Socialization, particularly the relationship between social structure and behavior; child and adolescent development; family interaction; early cognitive development; political socialization.

Robert H. Koff, Assistant Professor of Education, Director, Stanford Teacher Education Program. A. B., Psychology, University of Michigan, 1961; A. M., Educational Psychology, University of Chicago, 1962; Ph. D., Educational Psychology, University of Chicago, 1966. General interests: Theories of teaching; interpersonal dynamics in instruction; social interaction.

Henry M. Levin, Associate Professor of Education and Affiliated Faculty of the Department of Economics. B. S., Economics, New York University, 1960; M. A., Economics, Rutgers University, 1962; Ph. D., Economics, Rutgers University, 1967. General interests: Economics of education; school finance, decentralization of large-city school districts.

John W. Meyer, Assistant Professor of Sociology. B. A., Psychology, Goshen College, 1955; M. A., Sociology, University of Colorado, 1957; Ph. D., Sociology, Columbia University, 1965. General interests: Methodology; social stratification; political sociology; sociology of education; formal organizations.

Robert L. Politzer, Professor of Education and Romance Linguistics. B. A., Romance Languages, Washington University, 1941; M. A., Romance Languages, Washington University, 1942; Ph. D., Romance Philology, Columbia University, 1947; D. S. Sc., Political Science and Economics, New School for Social Research, 1950. General interests: Historical and descriptive linguistics; applied linguistics; education research in foreign language education; language learning.

W. Richard Scott, Professor of Sociology. A. B., Sociology, University of Kansas, 1954; M. A., Sociology, University of Kansas, 1955; Ph. D., Sociology, University of Chicago, 1961. General interests: Study of formal organizations; professional groups; authority and evaluation processes.

Pauline S. Sears, Professor of Education. A. B., Psychology, Stanford University, 1930; M. A., Guidance, Teachers College, Columbia University, 1931; Ph. D., Psychology, Yale University, 1939. General interests: Child development. (On leave, 1968-69.)

Fannie R. Shaftel, Professor of Education. B. A., Elementary Education, Teachers College, Columbia University, 1935; M. A. Elementary Education, Teachers College, Columbia University, 1936; Ed. D., Elementary Education, Stanford University, 1948. General interests: Elementary curriculum; elementary social studies; intergroup education. (On leave.)

Joan E. Sieber, Assistant Professor of Education. B. S., Education, University of Delaware, 1962; M. A., Psychology, University of Delaware, 1964; Ph. D., Psychology, University of Delaware, 1965. General interests: Cognitive development--variables accounting for individual differences in curiosity, decision making, and problem solving.

Richard E. Snow, Associate Professor of Education, Coordinator, Heuristic Teaching Program. B. A., Psychology, University of Virginia, 1958; M. S., Psychology, Purdue University, 1960; Ph. D., Psychology, Purdue University, 1963. General interests: Psychological research on individual differences, particularly human abilities as related to learning; research on media and methods of instruction, including the behavior of human teachers; visual media for instructional and research purposes.

Maria D. Tenezakis, Research and Development Associate, Education. Diploma, Philology, University of Athens, Greece, 1950; Ph. D., Child Psychology, University of Athens, Greece, 1953; Diploma of Studies in Clinical Psychology, Institute of Psychology, University of Paris, France, 1957. General interests: Factors (in socializers and socializees) and processes underlying the formation of attitudes toward authority; antecedents and implications of changes in attitudes toward authority.

Carl E. Thoresen, Associate Professor of Education. A. B., History, University of California at Berkeley, 1955; M. A., Education, Stanford University, 1960; Ph. D., Counseling Psychology (Education), Stanford University, 1964. General interests: Experimental research in individual and group counseling-psychotherapy techniques; "systems" techniques in professional education training; behavioral-environmental analysis and modification strategies.

Paul Wallin, Professor of Sociology. B. A., Psychology, University of Manitoba, 1930; M. A., Psychology, University of Toronto, 1933; Ph. D., Sociology, University of Chicago, 1942. General interests: Sociology of education; social stratification; family; research methodology.

Richard L. Warren, Research and Development Associate, Education, Coordinator, Environment for Teaching Program. B. A., Philosophy, Harvard University, 1947; M. A., History, Peabody College for Teachers, 1950; Ph. D., Education, Stanford University, 1966. General interests: Anthropological perspectives on educational institutions.

C. EXECUTIVE BOARD

Robert N. Bush
N. L. Gage, Chairman (on leave, 1968-69)
Bruce Harlow
Robert D. Hess, Chairman (1968-69)
Robert H. Koff
Philip C. McKnight
Richard E. Snow
Jack E. Thomas
Richard L. Warren

D. NATIONAL ADVISORY PANEL

James W. Brown, Dean, Graduate Studies and Research, San Jose State College

John B. Carroll, Senior Research Psychologist, Center for Psychological Studies, Educational Testing Service

Francis S. Chase, Professor of Education and Dean Emeritus, Graduate School of Education, University of Chicago

John K. Hemphill, Director, Far West Laboratory for Educational Research and Development

Ernest R. Hilgard, Professor Emeritus of Psychology and Education, Stanford University

Wilson C. Riles, Director, Office of Compensatory Education, California State Department of Education

Robert M. Rosenzweig, Associate Provost, Stanford University

R. Nevitt Sanford, Director, Institute for the Study of Human Problems, Professor of Psychology and Education, Stanford University

Harold T. Santee, Superintendent, Palo Alto Unified School District

Wilbur Schramm, Janet M. Peck Professor of International Communication, Professor of Education, Director, Institute for Communication Research, Stanford University

B. Othanel Smith, Chairman, Department of History and Philosophy of Education, University of Illinois

Neil V. Sullivan, Commissioner of Education, Commonwealth of Massachusetts

E. LIST OF PUBLICATIONS AND PRODUCTS

(Note: This listing provides a summary of SCRDT publications and products issued since the Center's inception. A more complete list including Center-related books, journal articles, and dissertations is available upon request. The supply of many of the earlier publications is low or depleted. As indicated, certain publications are available through the ERIC Document Reproduction Service or have now appeared in journals.)

Research and Development Memoranda

1) Gage, N. L. Three pressing concerns of educational research. March 1967.

2) Gage, N. L. An analytical approach to research on instructional methods. March 1967. Also in Phi Delta Kappan, 1968, 49, 601-606. (ED 011 936)

3) McDonald, F. J. Applying the language of behavioral models to teaching acts. March 1967.

4) Snow, R. E. Brunswikian approaches to research on teaching. March 1967. Also in American Educational Research Journal, 1968, 5, 475-489.

5) Snow, R. E. Response complexity and experimental design. March 1967. (ED 011 938)

6) Allen, D. W. A differentiated teaching staff. March 1967.

7) Travers, K. S., Heath, R. W., & Cahen, L. S. Preferences for modes of expression in mathematics. May 1967.

8) Gage, N. L., & Unruh, W. R. Theoretical formulations for research on teaching. July 1967. Also in Review of Educational Research, 1967, 37, 358-370.

9) Yee, A. H., & Gage, N. L. Techniques for estimating the source and direction of causal influence in panel data. August 1967. Also in Psychological Bulletin, 1968, 70, 115-126.

10) Belgard, Maria R., Rosenshine, B., & Gage, N. L. The teacher's effectiveness in explaining: Evidence on its generality and correlation with students' ratings. (Now included in Gage et al., Technical Report No. 4)

11) Sieber, Joan E., & Kameya, L. I. The relationship between test anxiety and children's need for memory support in problem solving. September 1967. (ED 021 616)

13) Politzer, R. L. An exploratory study of the relation of teacher competence and performance to pupil attitudes toward foreign language learning. October 1967.

14) Elashoff, Janet D., & Abrams, A. Missing data in analysis of variance. November 1967.

15) Koff, R. H. Dynamics of task and process: The classroom as social organism. November 1967. Also in *Interaction Analysis Newsletter*, 1967, *3* (1), 23-26. (ED 017 975)

16) Koff, R. H. The definition of a cognitive control principle: A case of diminishing returns. December 1967. (ED 024 057)

17) Sieber, Joan E. Overcoming secondary ignorance: Learning to be uncertain. January 1968.

18) Snow, R. E. Toward a model of teacher-learner interaction. January 1968.

19) Koff, R. H., & Warren, R. L. Pre-theoretical considerations of uncertainty: An aspect of classroom communication. January 1968.

20) Koff, R. H., & Hawkes, T. H. Sociometric choice: A study of pupillary response. February 1968. Also in *Perceptual and Motor Skills*, 1968, *27*, 395-402. (ED 024 058)

21) Koff, R. H., & Hawkes, T. H. Personality correlates of sociometric status. May 1968. (ED 024 056)

22) Koff, R. H. Preferences of teacher trainees for teaching situations: The reaction to teaching situations test. May 1968.

23) Sieber, Joan E. Individual differences in decision making. February 1968.

24) McDonald, F. J. Training teachers as a research tool. February 1968.

25) Sieber, Joan E. A paradigm for experimental modification of the effects of test anxiety on cognitive processes. May 1968. Also in *American Educational Research Journal*, 1969, *6*, 46-61. (ED 020 549)

26) Gorth, W. P., Allen, D. W., Popejoy, L. W., & Stroud, T. W. Validation of a criterion of lecture effectiveness. March 1968. (ED 021 464)

27) Salomon, G., & Snow, R. E. The specification of film-attributes for psychological and educational research processes. March 1968. Also in *AV Communication Review*, 1968, *16*, 225-244. (ED 021 465)

28) Koff, R. H., & Feldman, D. H. Systematic changes in adult word-association norms 1910-1967: Implications for the language of the classroom. April 1968.

29) Sears, Pauline S. The study of development of creativity: Research problems in parental antecedents. April 1968. (ED 021 279)

30) McDonald, F. J. A model of mathemagenic behavior as intervening variables in classroom communication. April 1968.

31) Sears, Pauline S., & Feldman, D. H. Changes in young children's behavior after a year of computer-assisted instruction: An exploratory study. May 1968. (ED 022 366)

32) Bush, R. N. New directions for research and development in teacher education. May 1968.

33) Gage, N. L. Teaching methods. July 1968. Also in R. L. Ebel (Ed.), *Encyclopedia of Educational Research*. New York: The Macmillan Co., 1969. Pp. 1446-1458.

34) Elashoff, Janet D. Analysis of covariance. August 1968.

35) Reimanis, G. Social approval and achievement striving in the kindergarten. June 1968.

36) Baral, D. P., Snow, R. E., & Allen, D. W. A taxonomy of teaching behaviors: Progress report. September 1968.

37) Roy, L., & Heath, R. W. Interviews with four black parents. September 1968.

38) Feldman, D. H. A study of fixed sequence of skill and concept acquisition requisite to performance of a common school task: Map drawing. September 1968.

39) Taylor, M. Intercorrelations among three methods of estimating student attention. September 1968.

40) Politzer, R. L. Problems in applying foreign language teaching methods to the teaching of standard English as a second dialect. December 1968.

41) Levin, H. M. Cost-effectiveness analysis and educational policy--profusion, confusion, promise. December 1968.

42) Aiken, L. R., Jr. Interactions among group regressions: An old method in a new setting. December 1968.

43) Ramirez, Judith V. Teacher behavior in role playing: A study in interaction analysis. February 1969.

44) Salomon, G., & McDonald, F. J. Pre- and posttest reactions to self-viewing one's teaching performance on videotape. March 1969.

45) Warren, R. L. Teacher encounters: A typology for ethnographic research on the teaching experience. March 1969.

46) Politzer, R. L., and Bartley, Diana E. Standard English and nonstandard dialects: Phonology and morphology. June 1969.

47) Bush, R. N. The status of the career teacher: Its effect upon the teacher dropout problem. April 1969.

48) McKnight, P. C., & Baral, D. P. [Compilers] Microteaching and the technical skills of teaching: A bibliography of research and development at Stanford University, 1963-1969. June 1969.

49) Salomon, G., & Sieber, Joan E. Relevant subjective response uncertainty as a function of stimulus-task interaction. April 1969.

50) Levin, H. M. Decentralization and the finance of inner-city schools. May 1969.

Technical Reports

1) Politzer, R. L. Practice-centered teacher training: French. 1966. (Available in ED 011 934)

1A) Politzer, R. L. Performance criteria for the foreign language teacher. 1966. (Available in ED 011 934 or ED 013 032)

2) Politzer, R. L., & Bartley, Diana E. Practice-centered teacher training: Spanish. 1967. (ED 013 032)

3) McDonald, F. J., & Allen, D. W. Training effects of feedback and modeling procedures on teaching performance. 1967. (ED 017 985)

4) Gage, N. L., Belgard, Maria, Dell, D., Hiller, J. E., Rosenshine, B., & Unruh, W. R. Explorations of the teacher's effectiveness in explaining. December 1968.

5) Politzer, R. L., & Weiss, L. Characteristics and behaviors of the successful foreign language teacher. April 1969.

6) Claus, Karen E. Effects of modeling and feedback treatments of the development of teachers' questioning skills. June 1969. (In press.)

7) Feldman, D. H. The fixed-sequence hypothesis: Ethnic differences in the development of spatial reasoning. June 1969.

Other Center Publications

Proposal to establish the Center. 1964. (No longer available.)

First Annual Report. 1967. (No longer available.)

Second Annual Report. 1968. (ED 024 642) (No longer available.)

Third Annual Report. 1968. (Supply limited.)

Films

Microteaching: What's That? 1967. Imaginative introduction to microteaching from the perspective of a teaching intern anticipating her first microteaching experience. 30 min., color. Price $200, rental $30. Plus postage.

Technical Skills of Teaching. 1968. A master teacher models three technical skills: silence (listening), reinforcement, probing. Commentary by F. J. McDonald. 30 min., color. Price $200, rental $30. Plus postage.

Teachers and Classes. 1967. Covers classroom discipline situations. 40 min., BW. (Address requests to Secondary Teacher Education Program, School of Education, Stanford University; price $200, rental including postage $20.80.)

Note: Films are available only in limited quantities and therefore cannot be supplied on a preview for purchase basis.

Audio Tapes

Tomorrow Never Comes. Thirty-minute taped interview with a black parent, dealing with his and his children's educational experiences, values, and attitudes. Price $3.25.

F. DISTRIBUTION OF THIS REPORT

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SCRDT Senior Staff	(25)
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